LIBRARY OF CONGRESS
1800

THE

TRANSACTIONS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON.

VOL. II.

LONDON:

PRINTED FOR THE SOCIETY BY C. ROWORTH AND SONS,
BELL YARD, FLEET STREET.

SOLD BY LONGMAN, REES, ORME, BROWN, GREEN AND LONGMAN,
PATERNOSTER ROW.

AND J. B. BAILLIERE, 219, REGENT STREET, AND RUE DE L'ECOLE DE MEDECINE À PARIS.

1837—1840.

QL461
.R65

CONTENTS

OF

VOLUME II.

Page.

PART I. 1837.

I. Some Account of the Habits of an East Indian Species of Butterfly, belonging to the Genus *Thecla*. By J. O. Westwood, F.L.S. &c. 1

II. Description of a new Coleopterous Genus, belonging to the Tribe *Prionida*, termed *Torneutes*. By G. Ch. Reich, M.D. &c. 9

III. Account of the *Poma Sodomitica*, or Dead-Sea Apples. By Walter Elliott, Esq., M.E.S. 14

IV. Descriptions of several new Species of Exotic Hemipterous Insects. By J. O. Westwood, F.L.S. &c. 18

V. Remarks on the Turnip-Fly (*Haltica nemorum*). By Henry Le Keux, Esq. 24

VI. Description of a new Irish Crustaceous Animal. By Robert Templeton, Esq., R.A. 34

VII. Notes respecting the Variety of the Silk-Worm which spins white Silk. By W. Sells, Esq., M.E.S. 40

VIII. On the Golofa Beetle of Venezuela and its allied Species. By the Rev. F. W. Hope, M.A., F.R.S., &c. 42

IX. Observations and Experiments for excluding the House and other Flies from Apartments by means of Nets. By the Rev. E. Stanley (now Bishop of Norwich). 45

X. Observations on Succinic Insects. By the Rev. F. W. Hope, M.A., F.R.S., &c. 46

XI. Description of *Cucullia Solidaginis*, together with its larva. By James Francis Stephens, Esq., P.E.S., F.L.S., &c. . . 57

XII. Notice of the Coleopterous Insects observed in the Scilly Islands in July and August, 1836. By Frederick Holme, Esq., M.A., M.E.S. 58

Page.

XIII. On the Domestic Habits of a minute Species of Ant. By J. Bostock, M.D., F.R.S., &c. 65

XIV. Descriptions of new Exotic *Aculeate Hymenoptera*. By W. E. Shuckard, Esq., V.P.E.S. 68

Journal of Proceedings i

PART II. 1838.

XV. Descriptions of two Species of the Coleopterous Family *Paussidæ*. By W. W. Saunders, Esq., F.L.S., &c. 83

XVI. Descriptions of some new or but imperfectly known Species belonging to the Coleopterous Family *Paussidæ*. By J. O. Westwood, F.L.S. 84

XVII. Note respecting the Larvæ of *Blaps Mortisaga*. By Robert Patterson, Esq., V.P. Nat. Hist. Soc. Belfast. With a Description of the Larvæ. By A. H. Haliday, Esq., M.A. . 99

XVIII. Some Account of the Genus *Myocoris*, of the Family *Reduvini*. By Dr. Hermann Burmeister, Fellow of the Naturalist Society of Berlin, For. M.E.S., &c. (Communicated by J. O. Westwood.) 102

XIX. On the Ravages of the Turnip Fly (*Haltica nemorum*), with Experiments. By T. S. 108

XX. Description of a new Genus of Exotic Bees. By J. O. Westwood, F.L.S. 112

XXI. Description of a new Irish Crustaceous Animal. By Robert Templeton, Esq., R.A. 114

XXII. On the Apod Larvæ of the Hymenoptera, with Reference to the Segmental Theory of Annulose Animals. By J. O. Westwood, F.L.S., &c. 121

XXIII. Descriptions of some Species of *Carabidæ*, collected by Charles Darwin, Esq., in his late Voyage. By the Rev. F. W. Hope, M.A., F.R.S., &c. 128

XXIV. Descriptions of some of the Insects brought to this Country by C. Darwin, Esq. By G. R. Waterhouse, Esq., Curator to the Zoological Society of London. 131

XXV. Observations on the Habits of the Purple Emperor (*Apatura Iris*). By the late P. S. Pallas, M.D. 136

XXVI. Synopsis of the Species belonging to the Genus *Castnia*. By George Robert Gray, Esq., M.E.S. 140

XXVII. Notice sur le Male de l'*Epomidiopteron Julii*. Par M. de Romand, de Tours, Chev. de Leg. d'Honneur, &c.) . . . 149

Page.

PART III. 1839.

XXVIII. Description of a new Genus of Dipterous Insects from New South Wales. By J. O. Westwood, F.L.S. 151

XXIX. Notice of a Case in which the Larvæ of a Dipterous Insect, supposed to be the *Anthomyia Canicularis* (Meigen), were expelled in large quantities from the human intestines; accompanied by a Description of the same. By the Rev. Leonard Jenyns, M.A., F.L.S., &c. 152

XXX. Observations upon the Economy of a South-American Species of the Coleopterous Genus *Upis*, with a few Remarks upon Carpophagous Insects in general. By J. O. Westwood, F.L.S. 157

XXXI. Remarks upon the above paper. By W. Sells, Esq. M.E.S. 162

XXXII. Monograph upon the Hymenopterous Genus *Scleroderma*. By J. O. Westwood, F.L.S. 164

XXXIII. On the Notions entertained respecting the Emblem *Scarabæus*. By the Rev. F. W. Hope, M.A., F.R.S. 172

XXXIV. Description of a new Genus of Coleopterous Insects from Corfu. By J. O. Westwood, F.L.S. 174

XXXV. Description of six new East Indian Coleoptera. By W. W. Saunders, Esq., F.L.S. 176

XXXVI. Observations in support of the Opinion, that the *Blatta*, or *Cockroach*, cannot be considered the same Insect as *Oreb*, the Fly which humbled the pride of Pharaoh. By the Rev. F. W. Hope, M.A., F.R.S., &c. 179

XXXVII. Notice of a minute Parasite inhabiting the Larva of the *Stylopidæ*; and upon the Animal produced from the Eggs of *Meloe*. By J. O. Westwood, F.L.S. 184

XXXVIII. Descriptions of some new Species of Exotic Insects. By G. R. Waterhouse, Esq., M.E.S., Curator of the Zoological Society 188

XXXIX. Observations upon the *Chigoe*, or *Pulex Penetrans*. By W. Sells, Esq. 196

Journal of Proceedings xxxix

PART IV. 1840.

XL. On the Characters of the *Chigoe* or *Jigger*. By J. O. Westwood, F.L.S. &c. 199

XLI. Description of a minute Crustaceous Animal from the Island of Mauritius. By Robert Templeton, Esq., R.A. . . . 203

Page.

XLII. Notes respecting the Nest of *Cteniza nidulans*. By W. Sells, Esq. 207

XLIII. On some Doubts respecting the Œconomy of Ants. By the Rev. F. W. Hope 211

XLIV. On Caprification as practised upon the Figs in the South of Europe and the Levant, with Descriptions of the Insects employed for that purpose; and Observations upon the *Agaon Paradoxum* of Dalman. By J. O. Westwood, F.L.S., &c. . 214

XLV. Descriptions of two new Coleopterous Insects, from the Collection of Sir Patrick Walker. By G. R. Waterhouse, Esq. Curator to the Museum of the Zoological Society 225

XLVI. On the Use of the Antennæ of Insects. By George Newport, Member of the Royal College of Surgeons, and V. P. of the Entomological Society of London 229

XLVII. Memoir on the Genus *Holoptilus*. By J. O. Westwood, F.L.S., &c. 248

XLVIII. Notice of some Peculiarities observable in the Cornea of the Eyes of certain Insects. By Robert J. Ashton, Esq. . 253

XLIX. On Insects and their Larvæ occasionally found in the Human Body. By the Rev. F. W. Hope, F.R.S. and Pres. Ent. Soc. 256

Errata and Addenda 272

Journal of Proceedings lxix

Additions to the Library from the 31st December, 1836, to the 30th September, 1840 lxxxvii

Explanation of the Plates in Volume II.

List of Members and Officers.

EXPLANATION OF THE PLATES.

PLATE.				PAGE.
I.	.....	*Thecla Isocrates*	described in Art. i.	1
II.	Fig. 1—3.	*Torneutes pallidipennis*	ii.	9
	— 4—8.	New exotic *Hemiptera*.....	iv.	18
	— 9, 10.	Pupa of *Euplœa* and *Chalcis Euplœæ*.....	Journ.	vi.
III.	— 1—3.	*Poma Sodomitica*	Art. iii.	14
	— 4.	*Cynips insana*		17
	— 5.	*Ephialtes Sodomiticus*		17
	— 6, 7.	*Cucullia Solidaginis*	xi.	57
	— 8.	*Curculio* infested with fungus.....	Journ.	vi.
IV.	— 1—6.	Transformations of the Turnip Fly	Art. v.	24
	— 7.	Egg of *Leucophasia Sinaps*.....		34
	— 8.	Egg of *Plusia gamma*.....		34
V.	.....	*Anomalocera Pattersonii*	vi.	35
VI.	.....	*Golofa Porteri*.....	viii.	42
VII.	.....	Succinic insects	x.	47
VIII.	.....	New exotic *Hymenoptera*.....	xiv.	68
IX. & X.	.....	Species of *Paussidæ*, &c.....	xv. & xvi.	83
XI.	Fig. 1.	Larva of *Blaps mortisaga*.....	xvii.	99
	— 2—6.	*Myocoris gracilis*.....	xviii.	102
	— 7.	*Mesotrichia torrida*	xx.	112
XII.	.....	*Zoea Pattersonii*	xxi.	114
XIII.	.....	Species of *Castnia*	xxvi.	140
XIV.	Fig. 1—8.	*Epomidiopteron Julii*	xxvii.	149
	— 9.	*Trichopsidea Œstracea*.....	xxviii.	151
	— 10.	*Amauronia subœnæa*.....	xxxiv.	174
	— 11—18.	*Upis Morio*	xxx.	157
XV.	— 1—8.	Larva of *Anthomyia Canicularis*	xxix.	152
	— 10—12.	Species of *Scleroderma*.....	xxxii.	164
	— 13.	Parasites of *Stylops*	xxxvii.	184
	— 14.	Larva? of *Meloe*		
XVI.	.....	New exotic *Coleoptera*	xxxv.	176
XVII.	.....	New exotic insects	xxxviii.	188
XVIII.	.....	*Zenxo Westwoodiana*	xli.	203
XIX.	.....	*Cteniza nidulans* and nest	xlii.	207

PLATE.				PAGE.
XX.	Fig. 1.	*Noctua* (*Xylophasia?*) *Ewingii*	Journ.	lv.
	— 2.	Autumnal disease of flies.....	Journ.	lxiv.
	— 3.	The *Chigoe* illustrated	Art. xl.	199
	— 4.	*Blastophaga Sycomori*	xlvi.	213
	— 5.	*Sycophaga crassipes*		
	— 6.	*Chalcis pyramidea*		224
XXI.	— 1.	*Baladeva Walkeri*	xlv.	225
	— 2—4.	Eyes of insects	xlviii.	253
XXII.	— 1.	Larva of *Œstrus Rhinocerontis*	xlix.	256
	— 2—5.	Various intestinal larvæ		
	— 6—8.	Species of *Holoptilus*	xlvii.	248

LIST OF MEMBERS

(TO THE 31st OCTOBER, 1840.)

Those Persons to whose Names an Asterisk is prefixed are Original Members.

HONORARY PRESIDENT.

*The Reverend William Kirby, M.A. F.R.S. L.S. Soc. Nat. Scient. Berol. et Cæs. Natur. Mosq. &c. &c.

HONORARY ENGLISH MEMBER.

*William Spence, Esq. F.R.S. L.S. &c.

HONORARY FOREIGN MEMBERS.

Audouin, M. Victor, Cheval. Leg. Honour, Professor at the Jardin des Plantes, President of the Entomological Society of Paris, &c. Paris.

Gravenhorst, Professor J. L. C. Phil. D. &c. Breslaw. Silesia.

Gyllenhal, Major Leonard, Cheval. of the Royal Order of Wasa, Memb. of the Acad. Sci. of Stockholm and Upsal, &c. Skara, Sweden.

Haan, W. De, Phil. Doct. Memb. Soc. Nat. Hist. Regensb. Calvados, Paris, &c. Conservator of the Museum, Leyden.

Hammerschmidt, L., Doctor of Laws, Member of various Societies of Natural History. Vienna.

Klug, Dr. Frederick, Hon. Memb. Ent. Soc. France, Director of the Entomological Department of the Royal Museum, Berlin.

Lefebvre, M. Alexandre, Corresp. Memb. of the Mus. d'Hist. Nat. de Paris, of the Imp. Soc. of Naturalists of Moscow, &c. Paris.

Passerini, Signor Carlo, Memb. of the Entomol. Soc. of France, Director of the Mus. of Nat. Hist. &c. Florence.

Schönherr, C. J., Councillor of Commerce, Cheval. of the Order of the Polar Star, Memb. of the Acad. of Nat. Sciences of Stockholm, Pisa, Moscow, Berlin, Leipsic. Skara, Sweden.

Weidemann, Dr. Chr. R. W., Professor of Zoology, Keil.

ORDINARY ENGLISH AND FOREIGN MEMBERS.

Agassiz, Louis M. Neufchatel, Switzerland.

Anderson, John, Esq. Richmond.

Ashton, Robert John, Esq. F.L.S. 2, Pelham Crescent, Brompton.

Aubé, M., Memb. Ent. Soc. France. Paris.

*Babington, Charles C., Esq. M.A. F.L.S. G.S. and C.P.S. St. John's College, Cambridge.
Bailey, Francis, Esq. L.L.D. V.P.R.S. F.L.S. M.R.I.A. Pres. As. Society, &c. Tavistock place, Tavistock square.
*Bainbridge, Mr. William. 6, Water lane, Broadway, Ludgate Hill.
*Barker, George, Esq. 17, Aldgate High street.
*Barnes, Joseph S., Esq. St. Luke's Hospital.
Barnes, Wm. George, Esq. 15, Great Russell street, Covent Garden.
*Bass, Isaac Gray, Esq. Brighton.
Bassi, The Chevalier Carlo. Milan.
Beadnall, John, Esq. Tottenham.
*Bevan, Dr. Edw. Ferryside, near Carmarthen.
Beck, Dr., Conservator of the Museum of the Crown Prince of Denmark. Copenhagen.
*Bell, Thomas, Esq. F.R.S. Prof. Zool. King's Coll. London, &c. Broad-street Buildings.
*Bennett, William, Esq. 48, Cannon street, London.
Berendt, Dr. Dantzig.
*Bird, Rev. C. S. Burghfield, near Reading.
*Blundell, Edward S., M.D. Lower Seymour street.
Bohn, H. G., Esq. 4, York street, Covent Garden.
Boisduval, M. Paris.
*Bowerbank, J. S., Esq. 19, Critchell place, New North road.
*Broadwood, Henry, Esq. Bryanston square.
Brook, M. Creveld, Bavaria.
*Broome, C. E., Esq. M.A. Cambridge.
*Browne, R. G. S., Esq. Dulwich College.
Burlington, The Right Honourable the Earl of. Burlington House.
Burmeister, Dr. Hermann, Phil. Doct. Prof. of Zool. in University of Halle.

Castelnau, M. Le Comté de. Paris.
Charlesworth, Edward, Esq. F.G.S. 103, Great Russell street, Bloomsbury.
Chaudoir, M. le Baron Maximilian de. Kiew. Dorpat, Livonia.
Chevrolat, M. Augustus. Paris.
*Children, J. G., Esq. F.R.S. and A.S. & R.S. Edinb. H.M.C.P.S. &c. Torrington square.
*Christy, John Fell. Clapham road.
Cochran, F., Esq.
Cockburn, Sir William Sarsfield Rossiter, Bart.
Cristofori, Signor. Milan.

*Darwin, Charles, Sec. G.S. &c. Great Marlborough street.
*Davis, A. H., F.L.S. M. Ent. Soc. France. Adelaide, New Holland.
De Jean, The Count. Paris.
*Desvignes, Peter, Esq. Golden square, St. James's.
*Desvignes, T., Esq. 2, Golden square, St. James's.
De Wael, M. Emilien. Antwerp.
*Doubleday, Mr. Edw. Epping.
*Doubleday, Mr. Henry. Epping.
Ducane, Capt. Southampton.

Dufour, M. Leon. St. Sever, France.
Dupont, M. Paris.

Edwardes, Sir Henry, Bart. Ryton, Salop.
Elliott, Walter, Esq. Madras Civil Service, Oriental Club House.
*Engleheart, N., Esq. Park, Blackheath.
Erichson, Dr. Frederick William. Berlin.
Esenbeck, Dr. Nees von. Breslau.
Evans, W. F., Esq. Admiralty, and Elm place, Brompton.
*Eveleigh, Joseph, Esq. Manchester.
Ewing, M. T. J. Sydney, New South Wales.'
*Eyton, Thomas. Eyton, near Wellington, Shropshire.

Fahræus, M., Chev. Polar Star, Governor of the District of Gottenburg, Sweden.
Fischer, Count Gotthelf, de Walldhein. Moscow.
Fleming, Rev. Dr., Prof. Nat. Phil. Univ. Aberdeen.
Fridvalsky von Fridval, M. Pesth, Hungary.
Frœlich, M. Eilvagen.

Gory, M. Hippolyte, Memb. Soc. Nat. Hist. et Ent. Soc. France. Paris.
*Gould, John, Esq. F.L.S. Z.S. Broad street, Golden square.
Graells, M. P. Barcelona, Spain.
Grant, ——, Esq. M.D. Richmond.
*Gray, George Robert, Esq. Mem. Soc. d'Ent. Fr. Hampstead Green.
Greenhough, G. B., Esq. F.R.S. L.S. G.S. &c. Grove House, Regent's Park.
*Griesbach, G. Adolphus, Esq. London.
*Griesbach, J. Henry. 3, Carlton Villa, Maida Hill.
*Griesbach, Al. Will., B.A. Rev. Weston, near Whitwell, York
Guérin, M. F. E., Memb. Soc. Hist. Nat. et d'Ent. France. Paris.
Gutch, J. W. G., Esq. Wind street, Swansea, Glamorganshire.

*Hanson, Samuel, Esq. Memb. Ent Soc. France. Botolph lane.
Harrison, W., Esq. F.R.S. A.S. Z.S. L.S. &c. Lincoln's Inn Fields.
*Hawkins, ——, Esq. M.D. Hackney road.
*Heales, G. S., Esq. Doctors' Commons.
Hearne, John, Esq. Port au Prince, Hayti. 59, Montague square.
Hely, Gorges, Esq. Johnston, Ireland.
*Hennessy, P. H.
Heyden, M. Le Senateur Van. Frankfort on the Main.
Higgins, Rev. Edw. Bosbury, Hereford.
*Hole, Henry. Ebberley house, near Great Torrington, North Devon.
Holme, Fred., Esq. M.A. Corpus Christi Coll. Oxford, and Windham Club, London.
Hooker, Joseph, Esq. Glasgow.
*Hope, Rev. Frederick William, M.A. F.R.S. Z.S. L.S. G.S. &c. 56, Upper Seymour street, Portman square.
Hope, Mrs. Frederick.
Hope, J. T., Esq. Netley, Shropshire.
Hope, Thomas H., Esq. Netley, Shropshire.
Horner, Edward, Esq. Grove hill, Camberwell.

*Horsfield, Thomas, M.D. F.R.S. L.S. Z.S. G.S. Acad. Cæs. Nat. Cur. Soc. &c. &c. Myddleton square, Islington.
Horsley, J. W., Rev. Turnham Green.
*Hoyer, Jacob, Esq. 1, Crown court, Threadneedle street.

Jarman, G., Esq. 21, Upper Berkeley street.
*Jenyns, Leonard, Rev., M.A. F.L.S. C.P.S. &c. Swaffham, Bulbeck.
*Image, John, Rev. Dulwich College.
Imhoff, M. Louis. Basle, Switzerland.
*Ingpen, Abel, Esq. A.L.S. 29, Upper Manor street, Chelsea.
*Johnson, E. A., Mr. Governor of the Gaol, Ipswich.

Kidd, John, Esq. M.D. F.R.S. H.M.C.P.S. Reg. Prof. Med. Oxford.
Knott, William, Esq. Wimborne, Dorsetshire.
Kunze, M. Leipzig.

Lacordaire, Th., Prof. Nat. Hist. Liege.
Lamb, ——, Esq. Beaufort, near Hastings.
Lambert, A. B., Esq. F.R.S. H.M.R.S.A. V.P.L.S. F.G.S. &c. 26, Grosvenor street.
*Lees, Edwin, Esq. Worcester.
Lehmann, Dr., Director of the Botanic Garden, Hamburgh.
*Leigh, H. T., Esq. Turnham Green.
*Letts, Thomas. Cornhill.
*Lewis, R. H., Esq. Hobart Town, Van Diemen's Land.
*Lewis, W. E., Esq. Hobart Town, Van Diemen's Land.
Lingwood, Rob. Maulkin, Esq. M.A. F.L.S. Christ Coll. Camb. and Hereford.
*Longman, W., Esq. jun. Paternoster row and Hampstead.
Lowe, Charles, Esq. Liverpool.
*Lucas, Geoffroy, Esq. Hitchen, Herts.

Maltby, T. W., Esq. Wyndham Club, St. James's, and Turnham Green.
Mannerheim, Count C. G. de, Governor of the Province of Wibourg, Finland.
*Marshall, Tho., Esq. 11, King William street, City, and 23, St. Paul's place, Balls' Pond.
Masters, Mr. William, jun. Canterbury.
Matthews, Andrew, Rev., M.A. Weston on the Green, Oxford.
*May, Rev. George. Strode house, Herne, and University Club, Pall Mall.
Mayne, J., Esq. F.R.S. and Z.S. F.A.S. 2, Harcourt buildings, Temple, and Teffont Ewyas House, Wiltshire.
*Melly, A., Esq. Liverpool.
Menetries, M. St. Petersburgh.
Mitford, Robert, Esq. Manchester street, Manchester square.
*Morris, Edmund, Esq. London.

Newport, Geo., Esq. 6, Somers street, Oxford terrace.
Norreys, Charles Denham Orlando Jephson, Esq M.P. F.G.S. Z.S. &c. Mallow Castle, Ireland.
*Norris, Thomas, Esq. Red Vales, Bury.

Ocskay von Ocsko, M. le Baron, Priv. Councillor of Emp. Austria, Memb. Nat. Hist. Soc. of Moscow and of the Acad. Cæsar. Leop. Carol. Naturæ Cur.

Ogilvy, Wm., Esq. M.A. F.L.S. Z.S. M.R.A.S. &c. Gower street, Bedford square.

Parry, Frederick, Esq. Wolseley terrace, Cheltenham.
Perty, M. Maximilian, Prof. Nat. Hist. Acad. Bernc.
Petit, Louis Hayes, Esq. M.P. F.R.S. A.S. L.S. and H.S. 9, New square, Lincoln's Inn.
Pettigrew, Thomas Joseph, Esq. F.R.S. A.S. &c. Saville row.
Phillips, Sir Thomas, Bart.
*Pickering, William B., Esq. Hammersmith.
Pictet, M. Geneva.
Plimley, Rev. Henry, M.A. Cuckfield, Sussex.
*Preston, Rev. J. D. J. Asham Bryant, near York.
Power, John Arthur, Esq. M.A. Clare Hall, Cambridge.

*Raddon, William, Esq. 4, Cumberland terrace, New Cut, Bristol.
Reich, Prof., M.D. Berlin.
Roger, M. Bordeaux.
*Roget, ——, M.D. F.R.S. &c. Bernard street, Russell square.
Roser, M. van, Director of the Chancery of the Minister for Foreign Affairs, Stuttgard.
Rucker, Sigismund, Esq. F.L.S. H.S. West Hill, Wandsworth.

Sahlberg, M. Finland.
Saunders, Joshua, Esq. East Hill, Wandsworth.
*Saunders, Sidney Smith, Esq. Previsa, Albania.
*Saunders, W. W., F.L.S. &c. East Hill, Wandsworth.
Scales, William, Esq. Stamford Hill.
Schuppell, Mons. Berlin.
Schwaegrichen, Professor. Leipzig.
Sells, W., Esq. Kingston-upon-Thames.
Shipster, G. F., Esq. 26, Great James street, Bedford row.
*Shuckard, William Edward, Esq. Libr. R.S. 31, Robert street, Chelsea.
Silbermann, M. Gustave. Strasbourg.
*Skrimshire, ——, Esq. London.
*Slaney, R., Esq. M.P.
*Smee, Capt. Walter, E.I.C. 61, Baker street, Portman square.
Sommer, M. Michael Christian. Altona, near Hamburgh.
*Spence, R. H., Esq. Hull.
*Spence, W. B., Esq. Florence.
Spinola, M. Maximilian. Genoa.
Spry, W., Esq. 76, Portland road, Regent's Park.
*Stephens, James F., Esq. Eltham Lodge, Foxley road, Kennington.
Stevens, Samuel, Esq. King's street, Covent Garden, and Hammersmith.
Strachan, J., Esq. Sierra Leone.
Streatfield, Rev. J., M.A. Margate, Kent.
*Sykes, Lieut. Col., F.R.S. G.S. L.S. M.R.A.S. Albion street, Hyde Park.

*Taylor, Richard, Esq. F.R.S. L.S. G.S. &c. Red Lion court, Fleet street.
Thompson, Charles J., Esq. F.L.S. &c. George street, Hanover square.
Thompson, Charles Thurston, Esq. Bedford place, Kensington.
Thwaites, G. H. R., Esq. Bristol.

Tulk, Alfred, Esq. 23, Henrietta square, Cavendish square, and East Brook place, Dover.
Turner, J., Esq. Manchester.

*Vigors, N. A., Esq. M.P. D.C.L. F.R.S. L.S. A.S. H.S. &c. Chester terrace, Regent's Park.
Villiers, M. Francois de, Cheval. Roy. and Mil. Ord. St. Ferdinand of Spain, Capt. of Infantry, Member of the Linn. Soc. Paris, of the Ent. Soc. of France, and Director of the Nat. Hist. Museum at Chartres.

*Walker, Francis, Esq. F.L.S. &c. Bedford square.
*Wailes, George. Newcastle.
*Walton, John. 9, Barnsbury terrace, Liverpool road, Islington.
*Waterhouse, George Robert, Esq. Zool. Soc. Leicester square.
Wells, H. G., Esq. Surbiton Lodge, Kingston-upon-Thames.
Westermann, M. Copenhagen.
*Westwood, John O., F.L.S., M. Soc. d'Ent. Fr., Hon. M. Soc. Nat. Hist. Lille, Lund., Mauritius, Moscow, Quebec. Grove, Hammersmith.
Whithill, Col., Hon. E. Ind. Comp. Serv.
White, Adam, Esq. Assistant Nat. British Museum.
Willcox, William, Esq. Dulwich Common.
Winthem, M. von. Hamburgh.
*Wood, William, Esq. F.R.S. F.L.S. Tavistock street, Covent Garden.

*Yarrell, William, Esq. F.L.S. Z.S. Amer. Soc. Ryder street, St. James's.

CORRESPONDING MEMBERS.

Cantor, Dr.
Downes, E., Esq. Himalaya.
Fortnum, C. D. E., Esq. Port Adelaide, South Australia.
Griffith, William, Esq. Madras Civil Service.
Mac Clelland, John, Esq. Bengal Med. Service.
Mitchell, Sir Livingston.
Porter, Sir Robert Kerr. South America.
Sayers, Lieut. H. R., 31st Regt.
Schomburgk, Dr. Demerara.
Templeton, Robert, Esq. Royal Artillery. Ceylon.
Tweedy, John Newman, Esq. Swedish and Norwegian Cons. &c. Hayti, Port au Prince.

OFFICERS.

1840.

The Rev. W. Kirby, M.A. F.R.S. &c.	*Honorary President.*
The Rev. F. W. Hope, M.A. F.R.S. &c.	*President.*
George Newport, Esq.	*Vice President.*
Francis Walker, Esq. F.L.S. G.S. &c.	*Vice President.*
John Walton, Esq.	*Vice President.*
W. Yarrell, Esq. F.L.S. Z.S. &c.	*Treasurer.*
J. O. Westwood, F.L.S. &c.	*Secretary.*
W. E. Shuckard and J. O. Westwood	*Curators.*
W. Bainbridge	*Sub-Curator.*

COUNCIL.

Messrs. Hope, Yarrell, Shuckard, Ingpen, Westwood, Marshall, Newport, Walton, Stephens, Bowerbank, W. W. Saunders, F. Walker, Charlesworth.

Observe:—*The Entomological Society does not hold itself responsible for any of the facts or opinions stated in the Memoirs published in these Transactions.*

TRANSACTIONS

OF THE

ENTOMOLOGICAL SOCIETY

OF

LONDON.

I. *Some Account of the Habits of an East Indian Species of Butterfly, belonging to the Genus* Thecla. *By* J. O. Westwood, *F. L. S. Sec. E. S., &c.*

[Read February 2, 1835.]

(Plate I.)

THE transformations of the species of hair-streak butterfly forming the subject of the following notice have been traced by Mr. Charles King of Madras, to whom and to Mr. Stuchbury, I am indebted for an opportunity of laying the details thereof before this Society.

This butterfly resides in the larva state in the interior of the pomegranate, seven or eight, at least, having been reared in the interior of the small fruit now exhibited. Of the mode in which the eggs are deposited by the female in the interior of the pomegranate no information has been received; it is, however, probable that this is effected whilst the fruit is in its very young state. The caterpillars feed upon the seeds and inner part of the fruit, which is thus rendered weak, and unable to support its own weight, and consequently liable to have its stem broken, and to fall to the ground with the first wind. This, however, would be destruction to the inclosed insects, since, in all probability, they would find it impossible to make their escape were the fruit to be suffered to lay rotting upon the ground. To obviate this evil, the caterpillars,

when full fed, have the instinct to eat a hole, about a quarter of an inch in diameter, through the hard shell of the fruit, whilst it remains upon the tree; through this hole they then creep to the stem of the fruit, and spin a white web, which they attach to the basal part of the fruit as well as to the stem, for about the distance of an inch along the latter. This web is sufficiently strong to support the pomegranate from falling after the wind has broken the stem near to the fruit; as is the case in the specimen of the fruit exhibited, and as represented in my figure.

From the circumstance of this specimen having as many holes in it as there were caterpillars inhabiting it, it is most probable that the web thus spun is a joint production of the whole.*

But it will be at once asked, what necessity could there be for the caterpillars to secure the fruit from falling after each has bored a hole, and thus made its escape? This question is answered by the curious circumstance that, after so securing the fruit, the caterpillars return again into the pomegranate, in the hollow interior of which they undergo their transformation to the chrysalis state.

Here, too, we may notice another interesting fact; namely, that the insect has the precautionary instinct, which acts as a second inducement, to make the aperture in the fruit in that stage of its existence in which it is furnished with organs best adapted for the purpose; for, had the larva omitted taking this step, the consequence would have been, that the poor insect, when come to its butterfly state, would have been a prisoner totally unable to make its escape, being unprovided with any instrument sufficiently powerful to make a hole in the shell. Some *Lepidoptera*, we know, such as the puss moth, are able, on arriving at the perfect state, to make their way out of cocoons, which are even harder than the shell of the pomegranate; but in these instances the cocoon has been rendered hard by means of glutinous matter secreted by the caterpillar, which the newly hatched moth has power to dissolve.

Many *Coleoptera*, especially amongst the wood-feeding species, have the instinct, immediately before assuming the pupa state, to eat a passage almost to the surface of the substances within which they reside, leaving only a thin covering, which the newly-hatched imago is able without difficulty to eat through.† But in this butter-

* It is curious, as evidencing the instinctive impulses under which each of the inclosed larvæ must have acted, that, instead of availing themselves of the first aperture made in the fruit, each caterpillar should be at the trouble of making a hole for itself, a circumstance which renders it the more probable that all joined in spinning the web.

† In some instances, however, even amongst the *Coleoptera*, a perfect orifice is

fly it is absolutely necessary that a complete aperture should be left open; and, as this is a circumstance which necessarily leaves the pupa exposed, it is not surprising that nature should seldom resort to such a proceeding in the case of internal feeding insects. Perhaps even in this almost solitary instance, we may fairly imagine that the situation is sufficiently retired to ensure them protection from many of their enemies. These chrysalides are attached horizontally upon the inner walls of the pomegranate, by means, first, of a patch of silk laid upon its surface, to the centre of which the tail of the chrysalis is affixed, and second, of a slender silken thread passing from side to side over the base of the abdominal segments. As to the manner in which the girthed suspension is effected after the larva has attached itself, I may be allowed to make the following short extract from Messrs. Kirby and Spence's third volume, p. 212. In this order of insects which have several modus operandi, some of the larvæ which have a short and more rigid body, (as *Lycæna Argus*, and many more of the Papiliones rurales and urbicolæ,) "after having bent the head on one side so as to fix one end of the thread, bring themselves into a straight position, and by a manœuvre, not easily described, contrive to introduce the head under the thread, which they then bend themselves to fasten on the other side, pushing it to its proper situation by the successive tension and contraction of their segments." A short time after this is effected, the skin of the caterpillar bursts, and its skin is gradually sloughed off beneath the girth, until the pupa is entirely naked; the exuviæ being collected at the extremity of the abdomen, as represented in my figures.

Another curious instance of instinct yet remains to be noticed. The butterfly, so soon as ever it has escaped from the puparium, must make its escape out of the hole formed by the larva. Delay would be death, as the wings would soon acquire their full expansion of nearly a couple of inches, in which state it would, of course, be unable to creep out.

We may easily imagine the beautiful appearance which a pomegranate tree must present at the moment when a whole brood of these pretty insects make their way to the daylight, their wings gradually expanding whilst seated on their old abode, or on adjoining stems, and their shining purple colours offering a beautiful contrast to the

made by the larvæ for the escape of the perfect beetle. This, at least, was the case in a specimen of *Saperda Cardui*, reared last summer by Mr. Stephens, the larva of which had the precaution to eat a hole through the cork stopper of the tin box in which it was enclosed; after making which, it returned into the box, and underwent the changes to the perfect state.

rich red colour of the pomegranate fruit. In the chrysalis state the belly of the insect is placed in contact with the inner surface of the fruit; consequently, as the slit by which the butterfly escapes out of the puparium extends along the back, the under surface of the latter remains entire, the anterior lateral portions on each side the slit (extending as far as the whole coverings of the wings) curling up and laying close upon those parts which had covered the breast and limbs, leaving the abdominal portion in the same form as when it inclosed the insect. This, therefore, enables me to give the following concise description of the pupa:—

Short, robust, obtuse at each end, posteriorly rounded, without any unevennesses upon the surface of the body, of a dark brown colour, covered with minute darker spots.

The perfect insect belongs to the genus *Thecla*, and to that section of it which Dr. Horsfield has termed *Thecla stricte sic dicta*. "Alæ posticæ appendiculo anali caudaque solitaria munitæ."

It may be thus characterized:—

Thecla Isocrates.

Supra. *Alæ* ♂ obscure fuscæ, nitore subplumbeo micantes, dimidio apicali in certo situ (nisi extremo apice anticarum) purpureo relucentes. ♀ fuscæ, basi subplumbeæ, anticæ macula centrali fulva.

In utroque sexu appendiculo anali maculisque duabus areæ analis nigris (quarum major in feminâ luteo intus cingitur), squamulis argenteis versus angulum ani notatis. Caudis nigris, apice albis.

Subtus. *Alæ* albido vel griseo canescentes, fasciis duabus tenuibus subregularibus per alas (pone medium) currentibus alterisque duabus in singulâ alâ abbreviatis discoïdeis, appendiculo anali nigro, macula anali cæruleo-argentea, alteraque approximata nigra, intus fulvo cincta.

Expans. alar. ♂ 1 unc. 4 lin. ♀ 1 unc. 8 lin.

Habitat in India orientali, ubi Punicas destruit; larvis semina devorantibus.

In Mus. nostr.

Syn. Hesperia Isocrates, Fab. Ent. Syst. 3. 266, 29, ♂. ♀ Encycl. Méthod. 9. 633.

Hesperia Pann. Fab. Ent. Syst. 3. 276. 67 ♀. Herbst. 288. 9. 10.

Wings above in the male of a dirty brown colour, with an obscure leaden coloured tinge, the exterior half of all the wings (except the outer angle of the upper) changing in certain lights to a rich purple colour; the borders of the wings are uniformly darker, the anal

area of the posterior wings is destitute of the purple reflexion, the short anal appendage black, with a lunule of silvery white scales, and with a black spot on each side of the base of the tail, the inner spot being the smallest and marked with silvery scales; the tail is black, with a white tip.

In the female the wings above are brown, the basal portion with an obscure leaden tinge, the edges darker, the upper pair with a luteous spot in the centre towards the costa. The anal area is marked as in the male, except that the outer black spot is inwardly edged with a luteous lunule; a few luteous scales are also observed at the base of the anal appendage. The ciliæ throughout white.

Beneath the wings in both sexes are of a delicate satin appearance, and of a very pale buff-grey colour, with a double row of slender darker lines beyond the middle, enclosing a nearly straight and slightly darker fascia in the fore-wings, but farther removed from the margin and more irregular in the under-pair. The centre of each wing is also maked with a short double row of lines; another and much less distinct double row of markings also occurs between the former and the outer margin of the wing, in the hinder pair; these latter markings enclose at the anal region two black ocellate spots, the exterior one being inwardly margined with a luteous lunule, the other ocellus occupying the anal appendage, and ornamented outwardly with a narrow metallic white streak; between these is a silvery blue spot. The margin of the anal area of the posterior wings is also terminated by a slender black line. The posterior wings are very slightly scolloped, the scollops growing more distinct towards the tail.

This insect is nearly allied to *Thecla Jarbas* and *Xenophon* of Fabricius, described in detail by Dr. Horsfield in his *Lepidoptera Javanica;* from these, however, (as I have been enabled by the kindness of the latter gentleman to ascertain from an inspection of his Javanese collections,) this insect is very distinct.

It also appears sufficiently distinct from *Polyommatus Philippus* of Fabr.

In the determination of the sexes of this species I have been guided by the anatomical characters exhibited by the legs; for a knowledge of the peculiarities existing in these organs we are indebted to Dr. Horsfield, who has thence ascertained the singular fact, that those individuals of our British species, *Thecla quercus*, which have been described by all authors as the males, are in fact females, and vice versâ. No figure has, however, hitherto been given of the structure of the male anterior tarsus, which consists of a single long joint; this joint is as long as the entire articulated

tarsus of the female, and when covered with scales might easily be regarded as similarly articulated. Hence we find Mr. Curtis describing the legs of *Thecla* alike in both sexes. The remarkable tooth near the extremity of the intermediate thigh on the underside, and the corresponding notch in the tibia, represented in my figure, were also first pointed out by Dr. Horsfield. In its perfect state this butterfly presents some curious points of relationship; the rich purple tint on the wings of the male calls to mind our *Thecla quercus*, but in that species it is the female, which (by a departure from the general rules of insect colouring) puts on the "imperial purple." On the other hand, the fulvous patch on the fore-wing of the female is also exhibited by the female of *Thecla Betulæ*, but the male of that species is not adorned with purple tint. The greater development of the tails and the anal appendage of the lower wings is also exhibited in several Indian and Javanese species, as *Thecla Jarbas* and *Xenophon*, and some others nearly allied. I have, however, only seen a single species in which the decided parallel row of lines beyond the centre of the wings runs through the whole extent. This is an East Indian species, contained in the museum of the East India Company, differing from mine in several particulars.

The genus *Thecla* exhibits in the pupa state several distinct variations of form.

In *Th. Pruni* and some allied species, as also in *Thecla* (*Amblypodia*) *Longinus*, the back of the abdomen is furnished with tubercles; these are wanting in *Thecla Xenophon* (or *Jarbas*), and in *Thcela* (*Amblypodia*), *Narada*, and *Appidanus*;* but in these species the abdomen is conical. In my species, and also in a species of *Thecla*, figured by Sepp, (Vol. ii. No. 2, pl. 1,) and misnamed by him *Th. Betulæ*, (to which species it is however allied,) the pupa is smooth, and the abdomen obtuse.

It only remains for me to notice, in illustration of the remarkable peculiarity in the economy of *Thecla Isocrates*, 1st, the habits of other species of this genus, all of which disagree with the former; and 2d, the economy of such species of butterflies as afford an analogy in this respect with this *Thecla*. Hitherto the larvæ of *Thecla* have only been observed to feed upon the *leaves* of different plants, and this is also the case with the nearly allied species *Thecla Xenophon*. The pupæ simply attach themselves to the twigs, or the leaves of the plants upon which they have been reared. Sometimes, however, the metamorphosis of some of the *Polyommatidæ* is effected partially in the ground.†

* Horsfield, Lep. Jav. Pl. iv. † Nouv. Dict. d'Hist. Nat. vol. 27, p. 482.

Messrs. Kirby and Spence, indeed, make the following observation upon the statement, that almost all butterflies suspend themselves, "Except some species of *Polyommatus*, Latr. (*Thecla Argynnis*, Fabr.), *P. Argiolus*, *Corydon*, &c., and *Hesperia Rubi Betulæ*, F. &c. Some of the larvæ of the *former* become pupæ within the stalk of some plant, or partly under the earth; * those of the *latter* usually in a leaf to which the abdomen is fastened by various threads. *These last* are the rouleuses of the butterfly tribe, living like some moths in leaves that they have rolled up;" and referring to the Nouv. Dict. d'Hist. Nat. 24, 499. The latter part only of this passage is, however, taken from that work, and refers to the genus *Hesperia* of the French authors, and not as made by Fabricius to include the *Theelæ*, which are not "rouleuses."

In the second place, so perfectly unique is the economy of this butterfly in its mode of feeding in the larva state, and precautionary suspension previous to assuming the pupa state, that the only analogous circumstances which I have met with throughout the whole of the genus *Papilio*, are the precautionary measures taken by the social larvæ of the Glanville fritillary (*Melitæa Cinxia*), previous to the setting-in of winter, in the construction of a more durable web than that which has served them for their ordinary tents, in which they remain in the caterpillar state until revived by the warmth of the following spring, when they again issue forth unchanged. In like manner the larvæ of the *White Admiral* (*Limenitis Camilla*), previous to the approach of winter, (as I have been informed by J. Barnes, Esq. M. E. S.,) secures the leaf, in which it remains unchanged until the spring, from falling, by attaching it to the twig on which it then hangs by means of a slight web. These instances it will, however, be observed, are not preparatory to undergoing the pupa state, and this necessity for the adoption of these precautions by the larvæ is much less obvious than where this step is taken for the safety of the chrysalis; since if the leaf, with the inclosed caterpillar, were to fall to the ground, there would be little difficulty in the caterpillar escaping; but were the pomegranate to fall, the insect inclosed could not possibly escape destruction. I may be allowed to close these remarks by observing, that, in the various points of economy already adduced, this butterfly is certainly one of the most interesting which has hitherto been traced through its different stages.

* In the 32nd number of the Magazine of Natural History is contained a notice of *Thecla Quercus*, undergoing (casually) its pupa state underground.

P. S. Since the preceding memoir was read, the two following notices, subsequently published, have been observed, which, in some respects, illustrate the habits of the insects in question.

M. Lacordaire (*Ann. Soc. Ent. de France*, 1833, p. 385) states that the larvæ of *Papilio Archelaus* live in societies, consisting of 100, 150, or 200 individuals, the community residing when very young upon a single leaf, arranged side by side, with the heads turned in the same direction. When one is touched, they all simultaneously raise their heads, moving them about in all directions, and at the same time renew their quiet position. When arrived at a more mature growth, they are found in the same position upon the trunk of the tree.

The other notice relates to *Saturnia Promethea*, a fine North American species, and is very analogous to the account of the proceedings of the *Thecla Isocrates*, given above. Mr. Titian Peale, to whom I am indebted for an extensive collection of North American insects, has given an interesting account of the habits of the *Saturnia Promethea*, in his valuable work, entitled *Lepidoptera Americana*, stating that its caterpillar, when full grown, selects a perfect leaf of the swamp button wood (*Cephalanthus Occidentalis*, upon which it feeds), the upper surface of which it covers with a fine light yellowish brown silk, extending this coating with great skill and foresight over the footstalk of the leaf, and *attaching it firmly to the branch* so as to secure the leaf from being separated by any accident. This preliminary object having been accomplished, the caterpillar next draws the edges of the leaf together, thus forming a perfect external covering or mantle, in which it spins a fine strong and durable cocoon of fine silk, in which it assumes the pupa state. At first, the leaf enveloping the cocoon remains green, but soon changes to a red or brown colour, when it becomes brittle, and is gradually carried away by the winds and storms of the winter, until finally nothing remains except the cocoon itself, which is firmly suspended by the silk which once covered the footstalk of the leaf. This defence, it will however be perceived, cannot be considered as so firm and complete as that prepared by the pomegranate butterfly.

II. *Description of a new Coleopterous Genus, belonging to the Tribe* Prionida, *termed* Torneutes. *By* G. Ch. Reich, *M.D., For. M. L. S. Lond., For. M. E. S., &c.*

[Read Nov. 2, 1835.]

Among a considerable number of coleopterous insects, collected in the province *Entre Rios*, of the state of *Argentina*, in South America, I had the pleasure to obtain the type of a new Genus of the Tribe of Prionida, which differs from each of the genera of Longicornes, *Latr.*, published (in the new classification) of that family, in the *Annales de la Société Entomologique de France, tome* i. *Paris*, 1832, 8vo. *p.* 118, &c., by M. *Audinet-Serville*, in so many points, that it cannot be brought under any of the fifty genera therein established. It is, especially in the much lengthened, slender, and subcylindric, or rather subdepressed form of its body, the uncommon number of twelve joints in the antennæ, the parallelopiped form of its unarmed thorax, and the shortness of its legs, by which it is distinguished at first sight from all the other genera of this tribe; and although the decreasing length and increasing narrowness of the joints of its filiform antennæ, from the basal joint to the apex, give to this insect some resemblance to the subtribe Spondylii, which the above-mentioned distinguished French Entomologist has placed at the head of his tribe Prionii, or rather with the genus Parandra, excluded by him from that tribe (so that we might possibly consider this new genus as the connecting link between the Spondylii and Prionii); yet it possesses a greater affinity to the last, so that it seems impossible to separate it from them, without violating the rules of a sound natural arrangement.

The Latin language being that of the true scholar in natural history, is here adopted. I would also suggest, at the same time, that the general appellations of the *Orders*, *Tribes*, and *Families*, as being adjectives referring to the substantives *Insecta*, *Coleoptera*, *Eleutherata*, &c. should always be given in the neuter gender, and never in the masculine or feminine.

Familia: Longicornia. *Latr.*
Tribus: Prionida.
Genus: Torneutes. (Tab. 2. fig. 1, 2, 3.)

Corpus elongatum, angustum, æquale, subcylindricum, *Statura* lineari, depressiuscula, et *facie* fere *Parandræ* giganticæ aut *Monotomatis* mutici.

Caput exsertum, porrectum, subrotundatum, latitudine in medio

thoracem æquante, longitudine hoc fere dimidio breviori, fronte inæquali impressa aut subretusa, fulvo pilosa, vertice convexiori, *subtus* utrinque ad menti insertionem *dente distincto* instructum.

Antennæ filiformes, breviusculæ, vix insertionem pedum intermediorum excedentes, ante oculos ad basin mandibularum insertæ, *duodecim articulatæ*, articulis a basi ad apicem usque sensim sensimque angustioribus et brevioribus, subcompressis, primo omnium longiori et validiori, basi subattenuato, apice subclavato; secundo brevissimo, hemisphærico; tertio basali paullo breviori et tenuiori, cylindrico; quarto præcedente iterum paullo breviori, subcylindrico; quinto et sexto fere æqualibus; septimo et octavo vix paullisper brevioribus, tenuioribus, æqualibus; nono, decimo et undecimo iterum paullo brevioribus et attenuatis, singulo vix tertiam basalis partem æquante; duodecimo et ultimo tenuissimo, subacuminato.

Oculi laterales, semilunares, parum prominuli, reticulati.

Clypeus transversus, integer, brevissimus, medio late emarginatus, pilis fulvis vestitus.

Labrum corneum, laminæforme, angustum, productum, quadratum, spatium intra mandibularum basin occupans, antice leviter emarginatum et medio fasciculo scrobiformi pilorum fulvorum præditum.

Mandibulæ corneæ, exsertæ, porrectæ, validæ, subtrigonæ, compressæ, punctatæ, basi latissimæ, longitudine caput fere æquantes, extus ad basin angulatæ, versus apicem subarcuatæ, apice acuto subincurvo terminatæ, intus verticaliter emarginatæ, dentibus tribus, anteriori sub apice obtusiori, medio acutiori, postico ad basin intus dilatatam subacuto, munitæ.

Maxillæ corneæ, subtrigonæ, oblique insitæ, inæqualiter constructæ, basi latissimæ, extus deorsum in processum longiorem apice subacutum et plicas corneas protensæ: *lobo interno* continuo conice assurgente, brevi, ubique una cum margine interno baseos subtiliter ciliato, *externo* sessili, internum longitudine duplo excedente, basi attenuato, sursum latiori, ovato, densius et fortius ciliato: *palpis maxillaribus* validiusculis, quadriarticulatis, ad basin lobi externi maxillæ lateri hujus affixis, nudis: articulo basali gracili, basi attenuato, apice vix paullo crassiori, secundo multo crassiori a basi graciliori in clavam subovatam extenso, tertio pæne dimidio breviori, crassiusculo, obovato, quarto paullo attenuato & longiori, apice obtuso.

Mentum corneum, brevissimum, late transversum, subarcuatum, medio denticulo vix conspicuo instructum: *labio* angusto, antice subemarginato, utrinque subtilissime ciliato: *palpis labialibus* maxillares longitudine æquantibus, basi approximatis, ad denticulum menti insertis, triarticulatis; articulo basali brevi, crassiusculo, cylindrico, pubescenti-ciliato, secundo et tertio elongatis, nudis, priori quam basali triplo fere longiori, subclavato, ultimo paullo breviori, elongato-subovato.

Thorax parallelepipedus, latitudine paullo longior, capitis medii diametro transverso et elytrorum basi æqualis, disco complanatus et subdepressus, lateribus muticus, haud marginatus, sed deflexo-rotundatus, subtus sine ora in antepectus transiens, angulis omnibus obtusatis et rotundatis, margine antico subemarginatus ad capitis receptionem, basi truncatus, fulvo-fimbriatus.

Dorsolum distinctum, corneum, formam laminæ in ambitu fulvo-ciliatæ exhibens.

Scutellum distinctum, parvum, corneum, apice rotundatum, sericeo-villosum, villis depressis incumbentibus.

Elytra thorace plus quam triplo longiora, rigida, linearia, versus apicem vix paullisper latiora, glabra, incumbentia, utrinque vix deflexa, marginata, humeris vix prominentibus, rotundatis, apice singulatim rotundata, mutica, disco lineis duabus longitudinalibus elevatis obsoletis ad apicem excurrentibus.

Antepectus simplex, partem contiguam et indivisam inferiorem thoracis formans, uniforme, immarginatum, rotundatum, glabrum, postice utrinque ad receptionem pedum anteriorum emarginatum, ponesternum intra coxas pedum simulans.

Medipectus breve, inæquale, ellipticum, medio sinuatum, utrinque ad receptionem pedum intermediorum emarginatum, medio postice foveolatum.

Postpectus longitudine prothoracis, scutiforme, convexum, medio linea longitudinali impressum, pube densissima obductum, parapleuris utrinque distinctis angustis ad insertionem coxæ utriusque pedis postici terminantibus præditum.

Pedes simplices, breviusculi, validi, æquales, antici et postici extensi, nec caput, nec abdomen longitudine excedentes: *femora* incrassata, compressa; *tibiæ* validiusculæ, subrectæ, apice intus vix calcare subtili instructæ; *tarsi* quadriarticulati, articulis tribus prioribus breviusculis, longitudine æqualibus, subdilatatis, subtus pulvinatis, primo trigono, secundo breviori, simili, tertio latiori, bilobo, quarto tenui, arcuato, nudo, longitudinis

duorum præcedentium insimul, apice unguiculis duobus brevibus validiusculis instructo.

Abdomen subparallelum, pallidius, griseo-pubescens, segmentis sex compositum, quorum primum sub postpectore occultum, angustum, in duas partes remotas laterales divisum; secundum latissimum, antice medio convexum, carinula inter coxas pedum posticorum interposita; sequentia paullo breviora, parallela, marginibus posticis pallide limbatis; ultimum brevius, paullo angustatum, apice medio emarginatum; ano subtus protruso bifido.

Species 1. T. Pallidipennis: subcylindrico-depressus, ater, nitidus; capite antice subretuso, rude punctato; thorace parallelepipedo, mutico, arctim subtilius punctato; disci linea media longitudinali, callosa, polita, medio quasi perforata, aliaque utrinque laterali abbreviata, antice crassiori, punctisque tribus lateralibus impressis cicatricosis oblique triangulatim positis; elytris linearibus parallelis, apicem versus vix paullisper latioribus, muticis, glabris, marginatis, testaceis; disci lineis duabus longitudinalibus elevatis, ad apicem rotundatum, obsolete excurrentibus; pedibus atro-piceis. *Variat* colore piceo.

Longitudo ab apice mandibularum ad anum trium fere pollicum, *latitudo* ad humeros elytrorum septem, ad apicem eorum octo ad novem linearum.

Habitat in provincia *Entre Rios* reipublicæ Argentinensis Americæ meridionalis, arbores corrodens. Tab. 2. fig. 1. magnitudine naturali; fig. 2. maxilla cum palpis; fig. 3, mentum cum palpis labialibus.

The external form of this beetle bears such a striking resemblance to some of the genera of the tribe (or, I should rather say, family,) Prionida, that I do not doubt but that it will be ranged, without hesitation, in the same family, inasmuch as its habits and metamorphoses are in all probability similar to other Prionida; for, although the singular filiform or rather short and almost subserrated or submoniliform antennæ, the distinct tooth at the insertion of the mentum on both sides of the mouth, and the unarmed thorax of this beetle, seem to approach the genus *Parandra*, which *Latreille* (Gen. Crustaceor. et Insector. III. 28) had established as the first of his *Prionii*, but which M. *Audinet Serville* (l. c.) has lately entirely excluded from them, there are yet so many grounds for agreeing with the proposed collocation, that I cannot abstain from placing the new genus Torneutes at the head of the true family Prionida, especially as it really seems to be a link of

the circular chain connecting all the xylophagous Coleoptera, and especially the three principal genera of the tribus *Prionii* of *Latreille* (Règne Animal, 2e edit.), viz. *Spondylis*, *Parandra*, and *Prionus*, with its numerous *subgenera*.

Having already mentioned some of the corresponding characters between *Parandra* and *Torneutes*, I have only to add, that the latter is distinguished by its twelve, not eleven-jointed antennæ, by its straight (not filiform) mandibles, by its rounded (neither depressed nor margined) thorax, by its short and stout feet, and by the absence of that singular appendage between the two lobes of the penultimate joint of the tarsi, characterising the larger species of the genus PARANDRA, whence it cannot be thought proper to unite them in the same genus: and however there may exist some resemblance between the genus *Spondylis* and that of *Torneutes*, in their external form, and especially their thorax and *habitus*, there are yet essential differences in the internal structure of their mouth and in their legs, so that it will be equally impossible to arrange them together. It seems, therefore, indispensable to place this new genus at the head of the *Prionida*, immediately in connection with the family to which *Parandra* is removed, but of which last-named genus the economy is identical with that of *Torneutes*.

Four specimens of TORNEUTES *pallidipennis* have been sent to me, agreeing in every respect. One of them has been presented to the Royal Collection of the University of Berlin; two (one with mutilated mandibles) are preserved in my own Collection; the fourth, destined for the Collection of the President of the Entomological Society, has been lost on its way to England, and was distinguished by a rudiment of a second small lateral abbreviated line, which is to be seen in the annexed figure.

The name is derived from the Greek word τορνευτης, *tornator*, alluding to its corroding the bark and wood of a high tree, unknown to me, in the province of *Entre Rios*.

It is clear, that the natural character of a genus, borrowed from a single species, may be very likely to embrace many of those marks which are rather diagnostics of the species itself. I hope, therefore, to be excused, if in case of any further increase of the number of species belonging to the new genus *Torneutes*, a modification of its generic character, as it is established in this essay, should be found requisite.

Berlin, Aug. 1835.

III. *Account of the* Poma Sodomitica, *or* Dead-Sea Apples. *By* Walter Elliot, *Esq. M. E. S.*

[Read August 3, 1835.]

(Plate 3, fig. 1—5.)

I have the honour to forward to the Entomological Society specimens of the Dead-Sea apples, and of an insect found therein, from the country beyond the Jordan. I also observed it growing plentifully on the different species of dwarf oaks in the Troad. I find the following memorandum made at the time:—"Among the trees" (in the forest between Ein Jerah and Adjeloon in the Hauran) "was one called Sajar el Fush (سجر الفش), on which we found what we conceived to be the true Dead-Sea apple described by Strabo. The Arabs told us to bite it, and laughed when they saw our mouths full of dry dust. It is about the shape and size of a small fig, of a dark reddish purple colour, with rows of small thorns in the upper end; it seemed not to be a fruit, though called so by the Arabs, but was attached artificially to the branches of this and another sort of tree. The inside was full of a snuff-coloured spongy substance, crumbling into dust when crushed. The less matured ones were green and spongy inside, and unctuous to the touch without. Most were perforated with a small hole. This and the mode of their attachment, and the fact that they contained no seeds, indicate them to be the work of an insect. The Arabs describe another excrescence on the same tree of a yellowish colour called Afs, (افس), which I believe to be the same excrescence in a less mature state." The insects sent herewith came out of the excrescences now forwarded on their way to England, and were found among the cotton in which they were packed.

The *Mala insana*, *Poma sodomitica*, or apples of the Dead-Sea, beautiful and tempting to the eye, but crumbling to dust and bitter ashes at the touch,—have been the subject of much controversy amongst travellers in the East and naturalists. Some authors, indeed, as Riland, Maundrell, and Shaw, have doubted the existence of this vegetable production, probably regarding it as one of the inventions of that poetical fancy which so greatly abounds in the works of Persian and other eastern writers. Its existence has,

however, been so generally believed that we find historians and poets speaking of it without any expression of doubt. Tacitus, Strabo, and Josephus all mention it; and Moore, who has collected so much information relative to the natural productions of the East, in the notes to *Lalla Rookh*, felicitously employs that now under consideration in one of his beautiful similes,—

> " Like Dead-Sea fruits that tempt the eye,
> But turn to ashes on the lips,"—

referring in the notes to a description of the apples of Isthakar, sweet on one side and bitter on the other.

Still greater diversity of opinion has existed relative to the real nature of these apples. Pococke supposed them to be pomegranates which had remained on the trees for several years, whereby the interior is dried to dust, although the outside may remain fair. Hasselquist pronounced it to be the fruit of the egg-plant nightshade (*Solanum Melongena*), growing near Jericho, and in the neighbourhood of the Dead-Sea; and which, when attacked by a *Tenthredo*, converts the whole of the inside into dust. M. Seetzen supposes it to be the fruit of a species of cotton-tree growing on the plain of El Ghor, and called *Abeschaez*, having no pulp, but the interior filled with cotton. Chateaubriand considered that he had solved the question, on discovering a shrub near the mouth of the river Jordan, which bears a fruit like a small Egyptian lemon, which, before it is ripe, is filled with a corrosive saline juice, and, when dead, yields a blackish seed compared to ashes, and resembling bitter pepper in its taste. Mr. Jolliffe thought he had found the true Dead-Sea apples in the fruit of a shrub growing near Jericho, of the size of a small apricot, and of a bright yellow colour. And, lastly, Captains Irby and Mangles regarded it as the seed of the *Oskar* plant, growing on the shores of the Dead-Sea. Mr. Conder, who has collected and reviewed these various opinions in his description of Palestine, forming one of the volumes of " *The Modern Traveller*," has considered that none of these statements agreed with the descriptions given by Tacitus and Josephus, adding with much sagacity, " It is possible, indeed, that what they describe " may have originated, like the oak galls in this country, in the " work of some insect, for these remarkable productions sometimes " acquire a considerable size and beauty of colour."

On the 2d June, 1835, a memoir was read before the Linnæan Society by Aylmer Bourke Lambert, Esq., F. R. S., V. P. L. S., &c., and published in the last part of the Transactions of that Society, (vol. xvii. p. 445,) giving a description of the real Dead-Sea apple, brought from the mountains in the neighbourhood of the Dead-Sea, by the Hon. Robert Curvon, and " which now proves to be a gall

" upon a species of oak, containing an insect." The plant is stated to be probably the *Quercus foliis dentato-aculeatis* of Hasselquist. Of the interior of the gall, it is added, that it may truly be said of it, that it is " as bitter as gall." The gall itself is described as pear-shaped, " with a circle of small sharp-pointed protuberances " on the upper part of it, which appear to be formed by the insect " for air, or defence, or some other purpose. In each of the galls " there is an aperture, through which the insect escapes, and in the " centre there is a small round hole or nidus where it lodged." There is also the following postcript: " Since writing the above I " find the leaves of the oak to be those of *Quercus infectoria*, which " is accurately figured in Olivier's *Travels in the Levant*, and that " the galls are identical with those of commerce.* The tree grows " abundantly throughout Syria. The insect has been named by " Olivier *Diplolepis*, and it is also accurately figured by him in the " above-mentioned work, but he does not appear to be aware of " the galls being the same with the *Mala insana*."†

The galls described by Mr. Lambert seem identical with those of Mr. Elliott, although there are several minute discrepancies, as well as additional observations, which an examination of the latter have enabled me to make. That these galls are the true Dead-Sea apples there can no longer be a question; nothing can be more beautiful than their rich, glossy, purplish red exterior—nothing more bitter than their porous and easily pulverized interior. Mr. Elliott's galls did not exhibit the regular transverse series of large pointed protuberances described by Mr. Lambert; instead of these, there were numerous irregularly placed and smaller elevations, generally obtuse, occasionally pointed; but these are integral portions of the gall, and it is difficult to conceive how they can serve the purposes suggested by Mr. Lambert. Notwithstanding the large size of these galls, (two inches long and an inch and a half in diameter,) each contains but a single insect, which makes its escape in the winged state, having consumed but a very small portion of the centre of the gall. The same circumstance occurs in some of our British galls; and it must be regarded as a curious fact, that so large and useless a provision is made for the insect.

The mode in which the gall is attached to the skin of the plant is curious, and unlike that of any other which I have seen; the base of the

* The galls of *Cynips Quercûs Tojæ*, which are found upon *Quercus Pyrenaica Willdenow (Q. Tosa Bosc.)*, and which are figured in the *Journal d'Hist. Nat.* tom. ii. pl. 32, and in Loudon's *Arboretum Britannicum*, p. 1843, have a much greater resemblance to the Dead-Sea apples than the real gall-nuts.

† A copy of Olivier's figure of this gall is given in the *Arboretum Britannicum*, p. 1931.

gall rising upwards on each side, and bending inwards so as to clasp the extremity of the twig somewhat like a pair of wide and curved nippers. I cannot agree with Mr. Lambert in regarding these galls as identical with those of commerce; the latter, as is well known, are not larger than a marble, and the interior is so hard that it can scarcely be cut with a pen-knife; the exterior, on the other hand, is of a dull and pale whitish brown colour. In this opinion, I am confirmed by J. F. Royle, Esq., Professor of Materia Medica in the King's College, London. In other respects, as in shape and protuberances, and in the circumstance of sheltering but a single inhabitant, &c. the two species of galls resemble each other.

Amongst Mr. Lambert's specimens of the galls, a true gall fly, belonging to the genus *Cynips* or *Diplolepis*, as Olivier misnamed it, was found, of which a figure was introduced into his original drawing, but this figure has not been published in Mr. Lambert's memoir. I have, however, been kindly permitted to introduce a copy of it into this memoir, but regret that I am unable to give a detailed description of it, or to institute a comparison between it and the *Cynips Gallæ tinctoriæ** or the *Cynips* of the gall of commerce; from which, however, it must evidently be specifically distinct, and consequently require a new specific name. I am enabled, however, to add a description of an *Ichneumonideous* insect which inhabits these galls, and which I have no hesitation in considering as parasitic upon the *Cynips* of the Dead-Sea or Mad apple.

Family Ichneumonidæ.

Sub-Family Ichneumonides.

Genus Pimpla.

(Sub-Genus Ephialtes, *Grav.*)

Species *Eph. Sodomiticus,* Westw.

E. niger, segmento 2do latitudine longiori, reliquis brevioribus; pedibus rufis, tibiis et tarsis posticis obscurioribus; oviductu corpore dimidio longiori.

Longitudino corporis lin. 5, ovid. lin. 8.

Habitat parasiticè in gallis vulgo "*Poma Sodomitica*" dictis.

In Musæo Soc. Ent. Londin.

Statura et summa affinitas *Eph.* tuberculati, messoris et mani-

* It is quite evident from Olivier's subsequent description of *Cynips Gallæ tinctoriæ*, (Encycl. Méth., vi. 281, *C. scriptorum*, Kirby and Spence, Intr. i. 319,) that he had confounded together two distinct species of galls, and the flies by which they are produced, namely, the Ink gall and the Mad apple. I would propose the name of *Cynips insana* for the insect of the latter. Olivier's figures of the Mad apple and its inhabitant are copied in the *Arboretum Britannicum*, pp. 1931, 1932.

festatoris. *Caput* cum antennis nigris, harum apice extremo subpallidioribus articulisque duobus basalibus subtùs interdum flavis, clypeo in medio rufescenti, palpis albidis. *Thorax* niger, confertissime punctatus, scutello semicirculari. *Pedes* quatuor antici rufi, femoribus basi pallidioribus, coxis albidis, tarsorum apice fusco; pedes 2 postici coxis femoribusque rufis, horum apice extremo fuscescenti, tibiis tarsisque fuscis, illarum basi subalbido fasciâque latâ centrali pallidè fuscis. *Alæ* hyalinæ vix fumatæ, nervis fuscis, stigmateque nigro, areolâ subtriangulari, anticè haud appendiculatâ. *Abdomen* feminæ, capite cum thorace dimidio longius, fere thoracis latitudine, subcylindricum, nigrum, punctatum, segmentorum margine et tuberculo laterali elevato nitidioribus, segmento 1mo subquadrato, angulis anticis rotundatis, utrinque impressione obliquâ notato; 2ndo latitudine dimidio longiori; 3tio quadrato segmentisque sequentibus brevioribus et longitudine decrescentibus. *Oviductus* corpore toto dimidio longior, vaginis nigris subhirtis, terebra pallida.

(J. O. W.)

DESCRIPTION OF THE FIGURES.

PLATE III.

Fig. 1. The Dead-Sea Apple of the natural size suspended from a twig and exhibiting the mode of suspension.
Fig. 2. The same opened.
Fig. 3. One of the larger leaves of the tree upon which it is found.
Fig. 4. *Cynips insana.*
Fig. 5. *Ephialtes Sodomiticus.*

IV. *Descriptions of several new Species of exotic Hemipterous Insects.* *By* J. O. Westwood, *F. L. S., &c.*

[Read November 2, 1835.]

Ordo HEMIPTERA.

Sub-Ordo Heteropterita, *Kirby.*

Sectio Terrestria.

Familia Pentatomidæ.

Genus. Eumetopia. Plate II. fig. 4.

Scutelleræ affinis. Corpus parvum, obovatum; abdomine scutello fere obtecto.

Caput breve, transversum, angulis anticis ante oculos productis et internè curvatis, clypeoque in medio in lobum parvum qua-

dratum producto. Oculi laterales postici. Ocelli 2, inter se et oculos æquè distantes.

Antennæ (4 *a*) thorace breviores, 5-articulatæ, articulo 2do brevissimo, reliquis longitudine fere æqualibus, basali paullo breviori et crassiori, inter oculos et basin rostri, sub capitis margine insertæ.

Promuscis (4 *b*) elongata, 4-articulata, articulis fere æqualibus.

Thorax transversus, anticè angustior, lateribus paullo rotundatis. Scutellum sub-quadratum, posticè rotundatum, abdomen fere obtegens. Hemelytrorum membrana nervis circiter 6 longitudinalibus, intermediis uni- vel bi-furcatis. Tibiæ spinosæ. Tarsi 3-articulati, articulo 2do brevissimo; ungues membranâ bipartitâ instructi.

Obs.—The remarkable structure of the head in the insect composing the type of this genus is totally unlike that of any other of the order with which I am acquainted.

Typus. Eumetopia *fissiceps*. Fig. 4.

Palidè fusco-testacea, undique fusco-punctata, capitis basi, fasciâ anticâ thoracis (in medio interruptâ) maculisque 4 scutelli (quarum anticâ majori) nigricantibus. Hemelytrorum corio lineis duabus fuscantibus, internâ in maculâ parvâ desinenti.

Long. corp. lin. 3. Expans. alar. lin. 6.

Habitat in Americâ meridionali.

In Mus. Dom. Hope, olim in Mus. Haworth.

Genus. Oncoscelis. Plate II. fig. 5.

Genus novum, è familiâ "*Scutati*," Burm. (*Pentatomites*, Laportii) *Tesseratomides* cum *Pentatomidis* conjungens.

Corpus magnum, depressum; capite parvo; abdomine magno, rotundato.

Caput parvum, subtrigonum, anticè paullo productum, subbifidum. Oculi magni laterales. Ocelli 2 postici.

Antennæ corporis dimidii longitudine, ante oculos insertæ, 5-articulatæ, articulo 1mo parvo; 2do, 4to et 5to elongatis, subæqualibus; 3tio, 1mi magnitudine; 5to ad apicem attenuato. Promuscis (5 *a*) 4-articulata, ad basin pedum intermediorum fere extensa; articulo 2do reliquis multo longiori, his brevibus.

Thorax magnus, transversus, depressus, abdominis basis latitudine, angulis lateralibus subacutis. Scutellum magnum, triangulare, apice rotundato. Hemelytrorum corium nervo valido sub

costali, cum multis aliis minoribus per discum ejus currentibus ; membranâ apicali nervis circiter 20 longitudinalibus.

Sternum et abdomen subtus mutica.

Pedes crassi, anteriores 4 sat breves, postici 2 (præsertim in ♂) incrassati ; femoribus elongatis, tibiis brevibus, ad basin curvatis et versus apicem internum spinâ validâ armatis. Tarsi 3-articulati, articulo 1mo crasso, subtus spongioso, 2do brevi, 3tio brevi ad apicem incrassato, unguibus 2 sat validis, singulo membranâ instructo (5 *b*, pes posticus ♀).

Abdomen maximum, rotundatum, depressum, marginibus detectis.

Obs.—The possession of tarsal pulvilli, and the insertion of the antennæ, distinguish this genus from *Aspongopus*, *Lap.*, whilst the simple sternum and abdomen remove it alike from *Rhaphigaster*, *Edessa*, *Tesseratoma*, *Oncomeris* and *Agapophyta*, which last three genera, moreover, have only four joints in the antennæ. In its simple sternum and abdomen and five-jointed antennæ it resembles the true *Pentatomidæ*, but its habit is certainly much nearer to that of the genera above mentioned.

Typus. *Oncoscelis Australasiæ*. Fig. 5.

Ferruginea : antennarum basi, scutello, abdominis lateribus, tibiisque nigricantibus.

Long. corp. lin. 14, latit. abdominis lin. 9.

Habitat in Nova Hollandia.

In Mus. Soc. Linn., Zool., et Entomol. Lond., Hope et nostr.

Caput fuscum, supra luteo-variegatum, marginibus lateralibus elevatis, lineâque impressâ è clypeo ad verticem. Antennæ fuscæ, articulis duobus apicalibus ferrugineis. Thorax ferrugineus, anticè pallidior, punctatus, lineisque multis transversis impressus, marginibus lateralibus paullo elevatis et lineâ tenui nigrâ notatis ; ocellis duobus ovatis, nigris, versus marginem anticum positis. Scutellum nigrum, maculis duabus lateralibus ad angulos anticos, lineâ tenui centrali et regione apicali ferrugineis, apice ipso nigro. Hemelytrorum corium ferrugineum, nervis fulvis. Membrana apicalis fusco-ænea, nitida. Abdomen lateribus supra nigricantibus. Corpus totum subtus ferrugineum. Pedes ferruginei, tibiis nigricantibus.

Genus. Cyclogaster. Plate II. fig. 6.

Tesseratomæ affinis. Corpus magnum, planum, submembranaceum, abdomine fere circulari, thorace depresso.

Caput (6 *a*) parvum, planum, fere ovatum, clypeo lineâ longitudinali

centrali impressâ margineque acuto, ad oculos in emarginaturâ anticâ thoracicâ receptum. Oculi parvi postici laterales, ocelli 2 minuti distantes.

Antennæ capite dimidio longiores, sub clypei margine insertæ, depressæ, 4-articulatæ, articulo 1mo brevissimo, occulto; 2ndo omnium longissimo, 3tio brevi, 4to paullo longiori, elongato-ovato, præcedenti vix crassiori.

Promuscis brevissima, pedes anticos vix attingens, 4-articulata, articulo 2ndo omnium longissimo.

Thorax transversus, anticè vix declivis, supra scutellum vix productus, marginibus lateralibus anticè rotundatis; anticè pro receptione capitis, emarginatus. Scutellum mediocre, triangulare. Sternum haud productum.

Pedes simplices sat graciles, femoribus cylindricis, tibiis rectis, tarsis (ut mihi videtur) tantum biarticulatis, unguibus membrana bifida instructis.

Hemelytra abdominis latera haud tegentia, corio vix coriaceo, nervis perpaucis et indistinctis, membranâque apicali nervis circiter 14 distinctis, longitudinalibus, interdum furcatis.

Abdomen magnum, fere circulare, supra depressum, apice emarginato, lateribus nudis.

Obs.—The simple sternum, rounded and depressed form, and very short antennæ and rostrum, will distinguish this curious genus from *Tesseratoma*, *Aspongopus* and others of the *Scutati*, which have only four joints in the antennæ.

Typus. *Cyclogaster pallidus*. Fig. 6.

Pallidè lutescens; capite, scutello, et thorace tenuissimè transversè punctatis, antennarum articulis intermediis obscurioribus rufescentibus.

Long. corp. lin. $12\frac{1}{2}$, lat. abdom. lin. 8.

Habitat in Gambiâ Africæ.

In Mus. Dom. Hope.

Obs.—Color lutescens in insecto viventi forsàn viridis.

Familia Capsidæ.

Genus. Eucerocoris. Plate II. fig. 7.

Genus novum, è familiâ *Capsidarum*, inter *Phytocoridem* et *Capsum* intermedium, longitudine antennarum è *Cimicibus* omnibus Linnæanis distinctum.

Corpus parvum, gracile, *Myocoridem* parvam simulans.

Caput (7 *a*) parvum, transversum, oculis lateralibus, ocellis destitutum. *Antennæ* corpore toto fere triplo longiores, 4-articu-

latæ, articulis tribus primis longitudine fere æqualibus, 1mo crassiori, 4to brevi, filiformi (vix setaceo). *Promuscis* ad basin pedum posticorum extensa, 4-articulata, articulo 3tio longiori.

Thorax in lobos duos divisus, lobo antico parvo capite angustiori, postico vero magno convexo. *Hemelytra* (7 *c*) abdomine dimidio longiora, tota fere membranacea, stigmate elongato nervoque brevi, ad apicem ejus emittente cum nervo altero (è basi interno membranæ emisso) connexo. *Pedes* elongati, graciles, femoribus posticis paullo curvatis.

Abdomen ♀ ut in *Miride* formatum. *Tarsi* 3-articulati, ungues pulvillis duobus instructi (7 *b*).

Typus. *Eucerocoris nigriceps*. Fig. 7.

Testacea, capite supra antennisque nigris; hemelytris et alis fuscis.

Long. corp. lin. $3\frac{1}{2}$. Exp. alar. lin. 7. Long. antenn. lin. $9\frac{1}{2}$.

Habitat —— ? In Mus. nostr. olim Haworthii.

Caput supra nigrum, nitidum, politum; subtus cum promuscide testaceo. Antennæ nigræ, articulo 1mo ad basin flavido. Thorax testaceus, nitidus. Scutellum fuscum. Abdomen et pedes testacea; tarsis omnibus, femoribus posticis ad apicem tibiisque posticis fuscis. Alæ cum hemelytris fuscæ, horum macula parva basali albida, stigmateque rufescenti, nervis nigris.

Obs.—I have seen but a single specimen of the curious insect which forms the type of this genus, which I purchased at the sale of the late Mr. Haworth's Collection. As there was no label attached to it, I am not aware of its locality. I should, however, conjecture, from its general appearance, that it is an inhabitant of Brazil.

Familia Reduviidæ.

Genus. Enicocephalus. Plate II. fig. 8.

Corpus parvum, oblongum, depressum, anticè attenuatum.

Caput (8 *a*, 8 *b*) in lobos duos divisum, quorum posterior est globosus ocellisque in portione ejus antica positis, oculis magnis lateralibus in basin portionis anticæ capitis locatis.

Antennæ (8 *a*) thorace vix longiores, articulis 4, ultimo haud setiformi, præcedenti saltem crassitudine, interdum illo crassiori (articulis minutissimis rudimentalibus inter articulos 1 & 2, 2 & 3, et 3 & 4). *Promuscis* (8 *b*) brevissima, crassa, arcuata, ultra basin portionis anticæ capitis haud protensa, 3-articulata, articulo 2ndo longiori.

Thorax subconicus (8 *a*), in tres nodos transversè constrictus; margine postico valde emarginato.

Pedes 2 antici dilatati, subraptorii, femoribus crassis, tibiarum apice (8 *c*) bispinoso, serieque setarum rigidarum armato, tarsis anticis compressis, (ut videtur 2-articulatis, articulo 1mo brevissimo), ungue unico valido armatis. Pedes 4 postici graciles, simplices; tarsis (ut videtur) 3-articulatis (8 *d*), articulo 1mo brevissimo, 2do brevi tertioque longiori.

Hemelytra (8 *e*) homogenea, nervis perpaucis crassis è basi ad apicem extensis, in speciebus paullo discrepantibus, sed cellulam magnam centralem versus apicem hemelytrorum formantibus.

Obs.—The very remarkable head, thorax, fore-legs and hemelytra distinguish these curious insects, not only from the remainder of the extensive family of the *Reduviidæ*, but also from every other *Hemipterous* group. I am acquainted with four species; one from the West Indies, another from Bengal, the third imbedded in Gum Animè, and the fourth from Van Diemen's Land, a remarkably wide range for a group like this, which, from the singularity of its structure, might be presumed to be very limited in the extent of its geographical distribution.

Species 1. (Typus.) *Enicocephalus flavicollis.* Plate II. fig. 8.

Fuscus, antennis pallidioribus; thoracis lobis duobus anticis, pedibus omnibus, rostro, et rotulâ caput cum thorace connectenti flavis; scutello nigro, antennarum articulo ultimo præcedenti paullo crassiori.

Long. corp. lin. 2.

Habitat in Insulâ Sancti Vincentii. Dom. Guilding.

In Mus. Dom. Hope.

Species 2. *Enicocephalus basalis.*

Fusco-niger, antennarum articulo ultimo præcedenti fere graciliori; capitis lobo postico, rotulâque caput cum thorace connectenti obscurè fulvescentibus; hemelytris fuscis, basi fulvis, portione internâ pallidiori; pedibus fulvescentibus, femoribus in medio tibiisque versus apicem fuscis.

Long. corp. lin. $3\frac{1}{4}$.

Habitat in Bengaliâ. In Mus. Dom. Hope.

Species 3. *Enicocephalus fulvescens.*

Pallidè fulvescens, oculis nigris, antennis (nisi articulis 1 et 4 et annulis rudimentalibus albidis), pedibus anticis thoracisque

lobo intermedio obscurè fuscis; thoracis angulis posticis albidis, nervis hemelytrorum obscurioribus.

Long. corp. lin. 3.

Individuum vidi unicum in Gummâ Animè inclusum. In Mus. Dom. Strong.

Species 4. *Enicocephalus Tasmanicus.*

Piceus, pilosus, antennis concoloribus; pedibus fuscis, geniculis omnibus, margineque interno femorum anticorum fulvescentibus; hemelytris et alis pallidè fuscis, nervis obscurioribus; margine externo hemelytrorum ad basin albido.

Long. corp. (alis clausis) lin. $3\frac{3}{4}$.

Habitat in Terrâ Van Diemenii.

In Mus. nostr. Communicavit Dom. Ewing, M. E. S.

V. *Remarks on the Turnip Fly* (Haltica nemorum). *By* Henry Le Keux, *Esq.*

(Tab. IV.)

Having thrown my notes together relating to the Turnip Fly, with such additional information upon the subject generally as I have been enabled to acquire, I have now the pleasure to lay them before the Society. I have made drawings (which I send with this) of the *eggs*, of the *larva*, and of its mode of burrowing in the turnip leaf, and also of the *perfect insect*, which, together with the accompanying figure of the *pupa*, by Mr. J. O. Westwood, will make the series of figures of the different states of the insect complete. I also send a small portion of a turnip leaf, with three eggs of the *Haltica* upon it, preserved in spirits.

Having witnessed the destructive effects of the Turnip Fly in the year 1830, whilst lodging at a farm-house in Devonshire, I was led to observe its habits, and to try many experiments, in the hope of being able to find some means of guarding against its attacks. My first observations were made upon a field of about eight acres, forming the apex of a hill, which was sown with turnips. When the young plants were just rising above the ground, the wind was in the south-east, and continued to blow from that point for more than a week, carrying in its course the scent of the turnips over

the fields lying to the north-west, and the turnips on the north-west side of the field were so destroyed by the fly that nearly an acre was quite bare, whilst the south-east side was not attacked in any perceptible degree until after the plants had attained to such a size as not to be much injured by their depredations. This circumstance led me to conclude that the fly had been attracted by the *scent*, which subsequent observations have confirmed. When I became familiar with the form and character of the insect, I very soon found that its locality was not confined to turnip fields, but that it was to be met with in grass lands which had not been ploughed for many years, and where no turnips were to be found within half a mile. I have since found them in abundance in dry situations in all grass lands where I have taken the trouble to search for them. Although I found the insect in such abundance, I was unsuccessful in my endeavours to discover its mode of breeding until after five years, when a small piece of land (the upper part of a field sown with barley) in a sheltered situation with a south aspect, and which had been well dressed with lime, was sown, early in May, with white stone turnips for the table, but they no sooner appeared above ground than they were destroyed by the fly; it was then sown again and harrowed, and the surface thickly strewed over with wood ashes, but the plants were again devoured as rapidly as before, and not more than a dozen acquired the rough leaf, and a few of these survived till the leaves grew to be six or seven inches in length, but they were perforated in every part. Upon examining one of these leaves (a portion of which, preserved dry, I send with this paper) against the light with a magnifying glass, I perceived a larva between the upper and under surface, a careful inspection of which led me to think it the larva of a *beetle*, and probably of the one I had been so long in search. I hastened back to the field, and carefully removed the earth around the plant from which the leaf had been taken, and there had the satisfaction to find the specimens of the larvæ and pupæ which I sent to my friend Mr. Raddon, who did me the favour to transmit them to the Entomological Society.

I had previously endeavoured to breed them by keeping a number confined in a small box covered with gauze wire, but as I could in this way only feed them by dropping in fresh bits of turnip leaf daily, I did not succeed in my object, although the insects appeared healthy, and I kept them alive in this manner from July until February in the following year. The reason of my failure is now sufficiently obvious, since it is necessary that the leaf should be in a growing state, otherwise the eggs which are laid upon it

shrivel up when the leaf becomes dry. Being still at fault as to the origin of the larvæ, I captured ten males and ten females in pairs, and inclosed them in a glass tube covered at each end with gauze wire, into which I introduced a single leaf of turnip, with water to keep it fresh; by this means I was enabled to examine the insects and leaf on all sides with a magnifying glass at any time without disturbing them. Having, previous to introducing the leaf, ascertained with a strong magnifier that there were no eggs or larvæ upon it, on the following day I had the satisfaction to perceive five small, smooth, oval-shaped eggs adhering to the underside of the leaf, and so nearly resembling it in colour that I was no longer surprised that they should hitherto have escaped my observation. This leaf was removed with the eggs upon it and placed in water, and its place supplied by a fresh one, which, on the following day, had three eggs upon it, and the third leaf four eggs, each of which leaves was placed separately in water. The fourth leaf I suffered to remain with the insects a week, supplying it with fresh water daily, and at the end of that time it had thirty-one eggs upon it. In two other glass tubes I confined single pairs of insects with a leaf in each, upon which I never found more than a single egg deposited on the same day, and in those leaves taken from the field with larvæ in them (some containing six) no two of them were of the same growth. I found great difficulty in preserving the leaves during the length of time necessary for the hatching of the eggs, and as it would have been impossible to have preserved them long enough for the feeding of the larvæ, I began to despair of success, until I observed that in those leaves taken with larva in them from the field, it was not uncommon for the larva to leave the burrow it had first commenced, and travelling (which from its formation I had supposed it incapable of doing) to a distant part of the leaf, form a new one. About the time, therefore, when I expected the eggs to hatch, I placed fresh leaves by the side of the old ones, to which the young larvæ soon found their way and lodged themselves. The egg hatches in ten days from the time it is laid, and the larva immediately begins to eat its way into the leaf, and form a burrow by feeding upon the pulp between the upper and under surface of the leaf, which however is not easily perceptible to the eye unless held up against the light, when it appears as represented in the drawing at A., although the track is sufficiently obvious after the larva has left it, and it has become dry, as shown at B. The larva (of which a magnified specimen is shown in the drawing) is full fed, and goes into the earth at the end of sixteen days, burying itself about an inch and a half below the sur-

face, and in such a situation, that the turnip leaf above may afford shelter in case of rain. I have reason to believe that it remains in the earth about a fortnight before changing into the perfect beetle. Some of the first specimens of larvæ and pupæ which I took in the field, I placed in finely pulverized and very dry earth, and in a few days they were shrivelled up; the others I also put into fine earth and saturated it with water. Unfortunately there was no opening at the bottom of the cup; and the next day, perceiving that the earth was still saturated with water, I drained it and removed the larva, but they were all dead; this accident may serve to account for the scarcity of the insects after very wet seasons. I have been equally unfortunate in my last attempt to ascertain the *precise* time between the larva and the perfect insect, for I covered the earth in which I had placed them so closely, on account of their small size, to prevent them from escaping unobserved, that the earth became mouldy, and they were all destroyed; but I have a great many specimens of the beetle produced from larvæ, which I fed and placed in a garden-pot enclosed in a cage of fine gauze wire, but they, being introduced at various times as they became full fed, I could not ascertain the precise time of any individual specimen.

Not being an entomologist, I cannot pretend to describe the insect scientifically, but it may perhaps be as well to state that, although commonly spoken of as a fly, it is a small *beetle (Haltica nemorum)* of a black colour, with a longitudinal stripe of light brown on each of the wing cases, and it is furnished with six legs, the hinder pair of which are powerful springers, like those of a flea, by means of which it is enabled to leap a distance of from twelve to eighteen inches without the aid of its wings, which latter I have not observed it to use except in warm sunshine, or when the thermometer stood above 70° in the shade. One day in May, 1836, when the thermometer stood at 75° in the shade, during a light south wind, great numbers of them were on the wing, which, from their minute size, I should not perhaps have observed but for the circumstance of their striking against me and falling, before they could recover their wings, upon a piece of white paper which was before me at the time, and I counted upwards of twenty in less than half an hour. They were all proceeding southward. When many of them are confined together, an odour like that of the "Lady Bird" beetle is perceptible, and is very strong from one that is crushed. They pair towards the end of May if the weather is warm, and continue to do so during the months of June, July, and August. They live through the winter secreted in the crevices of old timber, the rough bark of trees, and particularly in dry, loose

banks. They occasionally leave their hiding-places in the winter when an unusually warm day occurs; at such times I have met with them in the months of January, February, and March, on a barkless and decaying stump of a tree, on the side of a dry bank, and on clods of earth, when they were as active as in the summer, but only when the sun has been shining, and in a situation sheltered from the wind. But those which I have discovered in their haunts in cold weather were torpid or inactive; indeed I thought them dead until the warmth of my hand, in which I was conveying a number of them home, revived them, and in a few minutes they had all skipped away. From the fact of their being found in such various situations, I think there can be little doubt that they breed in many other plants beside turnips, probably in any of the cruciform kind. The weed growing in the hedges, and generally so annoyingly abundant in turnip fields, and called *Chorleigh* by the Devonshire farmers, affords the *Haltica* a welcome feast towards the end of April and during May, when I have found plants of this kind covered with them, and every leaf pierced full of holes, but these are presently deserted when any turnips appear in the neighbourhood.

I am sorry to be obliged to add, that in the more important object of my search for some antidote to their destructive attacks upon the young turnip, I have not hitherto been successful, although I have devoted much time to it, not neglecting any opportunity of trying such experiments as I thought likely to effect so desirable a purpose. The insects being so universally spread over the country, places the possibility of exterminating them out of the question. From the manner in which it breeds, it is obvious that no injury, or none of any consequence, is done to the turnip by the larva, the mischief being effected by the insect in its perfect state, which, having secreted itself through the winter, comes from its hiding-place with the return of warm weather, with a keen appetite, and is attracted from all quarters by the scent of turnips with as much certainty as the crow is attracted by the smell of carrion to feast upon its favourite food.

The inefficacy of *lime* as an antidote was strikingly apparent during my first observations, where the land was dressed with it (forty bushels to an acre) immediately before the seeds were sown, and when the plants came up and the fly was observed attacking them, *lime* dust was thrown over them, so that many of the plants were quite white with a coat of it. Notwithstanding this I found as many flies upon the whitened plants as upon any of those which were free from lime, and they were eventually devoured. In one part

where the fly was particularly numerous, I marked out a small square, and with a syringe washed over every plant within it, singly, with sulphate of potash ; but although it was so strong as to destroy some of the plants, and to leave a white sediment when dry upon all, I found the flies upon them the next day nearly as numerous as before this application. I wetted some of the plants with distilled water, (spring-water does not adhere so well to the plant,) and these were entirely free from the fly *so long as they remained wet ;* and if one happened to alight upon a wet plant, it instantly sprang off again. But of all the numerous applications which I tried upon the leaf, none were effectual in deterring the fly, though detrimental to the plant itself; and I found any attempts of this kind must be unavailing, because although the upper side of the leaf may by any preparation be rendered unpalatable, and even poisonous, to the insect, it will still eat away the *underside* with impunity, and leave nothing but the upper epidermis or skin.

I next tried various matters mixed up with or strewed upon the earth, that might be offensive to the fly by the odour or effluvia exhaling from them. The first of these was powdered sulphur strewed over about one-tenth of an inch thick ; the effluvia from this was perceptible to me when standing near it if the sun was shining, but so far from deterring the flies, I thought they appeared more numerous in this spot, and it certainly improved the appearance of the *plants* growing in it.

Amongst many other things, I tried snuff and assafœtida, and a box of the powder for preserving furs from moth, sold under the title of "*Anti Tinea*," but none of them had the slightest effect. Latterly I found it more convenient to try the effect of various substances on the side of a cage containing a great number of the flies, and having placed a small piece of carbonate of ammonia there, to my great delight all the flies drew away from it and kept in the further side of the cage ; upon changing its position to the side where they had all congregated, they immediately began to move away again. I then took a glass tube containing a number of them, and placing the lower gauze wire upon a large piece so that the effluvia from it might pass through the tube, when they instantly began to leap violently, but in a few seconds fell to the bottom motionless ; I immediately removed them, but they were quite dead, for not one recovered though laid upon fresh leaves. I congratulated myself on having at last found the object of my search, and went the same evening up the hill and sowed a patch with turnip seed, and on the fourth day (which I waited for with impatience) when I expected the plants to appear, I strewed it over

with the ammonia broken into fragments about the size of a pea, but when the turnips began to show above ground, my disappointment was extreme, to find that the effluvia was destructive to the young plant if a bit was lying within an inch of it, and those plants which were not injuriously affected by it were attacked by the fly. Notwithstanding this remarkable failure, I still think that the antidote, if ever found, must be sought for in some effluvia or odour which may be either offensive to the insect when near, or so overpower the scent of the turnip as to prevent the fly from distinguishing and being attracted by it. Or it may perhaps be equally advantageous, to divert their attacks by a more attractive food, such as sowing the *white stone turnip* mixed with the Swedish turnip; for I have *invariably* found where this has been done that the former are first attacked, and sometimes, indeed generally, nearly destroyed before the latter have been touched, and by that time have grown to such a size as not to be materially injured by them; and in seasons when the fly has not been very numerous, the "Swede" has not had a single puncture upon it, whilst every leaf of a white stone turnip, by the side of it, has been pierced full of holes. The last experiment which I tried had the appearance of being more successful than any of the preceding ones, but as it was made so late in the season, (the latter end of August,) and several days' rain (the best protection) occurred at the most critical time, it can hardly be called a fair trial. Having sown a little piece (a yard square) with turnips on the hill, swarming with the fly, I poured over it (on the fourth day) a quart of a mixture composed of one once of tar, one once of olive-oil, and two ounces of strong caustic potash, well mixed together, and then shaken up with the requisite quantity of water. Not many of the seeds came up (probably from the lateness of the season), but those were of a healthy colour, and acquired the rough leaf without any of them being punctured by the fly, excepting a few on the windward side of the patch.

This mixture formed no protection from the slug by which the plants were all soon eaten off. Having now left the county, I have no means of pursuing the inquiry, but I cannot help thinking this experiment would be worth repeating on a larger scale.

I believe it is not generally known that the Wire-Worm and the Ant are both entitled to a considerable share of the odium usually cast upon the fly alone; the latter, however, on account of the great devastation committed by it, is justly entitled to be considered as the *most* formidable enemy of the turnip crop. The wire-worm seldom feeds above ground in the day-time unless it be cloudy and dark; at such times I have observed them devouring the young

turnip plants before the rough leaf has been formed, but their most destructive operations are carried on beneath the surface of the earth, where they attack the root; in the very early state of the plant, after eating this through, the upper part of the plant is gradually drawn down into the earth and devoured, so that the plants disappear without any perceptible cause and without any trace of them being left. In the more advanced state of the plant their devastation appears to be confined to eating through the root, and having thus killed one plant they proceed to another. If a turnip plant appears drooping (as if from the want of water) whilst those in its neighbourhood are fresh and erect, a wire-worm (sometimes half a dozen) will be sure to be found at the root, if the earth around it be carefully removed. I think it probable that the *mole* may prove the best protection against the ravages of this insect, because I observed that seven years ago moles were very numerous all over the farm, and at that time the wire-worm was never found to be injurious to any of the crops; but a war of extermination has ever since been most sedulously carried on against the mole, and with such success that it has become a rare thing to meet with upon the farm. The wire-worm, on the contrary, is now so abundant as to cause very serious and perceptible injury by laying bare large patches in the different crops.

When the land is in a very dry state, every agriculturist must have experienced the great length of time the seed will remain in it without signs of vegetation, until after rain has fallen; and then he is surprised at the small number of plants in proportion to the seed sown, perhaps only one in about one thousand. In an instance of this kind, whilst searching for the *Haltica* with a magnifying glass, I observed many ants travelling along, each bearing similar particles of something in their mandibles, which, upon closer inspection, I found to be turnip seeds. As the ants were to be found all over the field busily occupied, if each of them carried off only one seed, the crop from those remaining would not require much thinning with the hoe afterwards. I fully intended to have traced some of them to their nests, and to have ascertained whether their granaries contained any store of turnip seeds, but accidental circumstances and other engagements prevented my doing so. Perhaps some one more at leisure than myself will find an opportunity of making the examination. With a view to guard against this evil, before sowing the seeds, I immersed them for five minutes in a solution of one drachm of corrosive sublimate in two quarts of water, and then spread them upon paper in the sun to dry, but this injured the germinating powers, as very few of them came up, and those looking feeble and sickly:

perhaps a much weaker solution and a simple immersion without permitting them to remain in it any time, would be sufficient to render the seed unpalatable to the insect without injuring its vegetating properties. The ant also injures the young plant, but in a small degree proportionate to the other two insects.

The appearance of an injured plant will enable any one examining it to decide whether it has been caused by the fly, the ant, or the wire-worm. The fly begins by eating a round hole, wide at top, and gradually diminishing to the bottom, until the leaf is perforated, when it sometimes continues to enlarge the aperture until its appetite is satisfied. The large holes observed in the leaves were made in their early state, and have enlarged with the growth of the leaf. The ant does not *eat* the leaf, but punctures it with its mandibles, and then sucking out the juices, produces yellow withered looking spots on the spring leaf, which destroys it. The wire-worm begins on the edge of the leaf, and eats it away like a caterpillar, and often cuts the leaf off at the top of the stalk, and it may sometimes be found on the ground half-devoured. One wire-worm will consume about as much as five or six flies could do in the same time.

The grub is also a very formidable assailant in the more advanced state of the plant, near to which it forms a round hole in a vertical direction (in appearance like that of an earth-worm, but open at the top) about two or three inches deep in the earth. At the bottom of this it remains during the day, (unless it be dark and moist,) and at night emerges from its burrow, and commences an attack upon the plant by eating round the neck of it, and eventually detaching the upper part from the root, or a single leaf is eaten through at the stem, and when fallen on the ground the nearest edge is dragged to the burrow, where it is drawn in and devoured during the day. Last year (1836) the turnips sown on the south side of a hill having entirely failed, it was ploughed in furrows, and each filled with yard dung, and the earth turned over it by the plough; and on the first rainy day a number of young plants of the Swedish turnip (thinned out from a patch in a moist situation on the north side) were planted on the ridges eighteen inches asunder, and very soon grew remarkably strong and healthy; but after the few straggling plants, in the part left unploughed, had been destroyed by the grub, then those at the extreme ends of the ridges began to disappear, and plant after plant followed from the same cause, until very few were left. Having noticed one fine plant at a distance of six or seven yards from any other, and that a grub had just formed his burrow and begun to attack it, I dissolved

a quarter of an ounce of common salt in a quart of water, and poured it over the plant, taking care not to let any run into the hole, or to disturb the grub. When I examined the plant the following day, no further injury had been done to it, and on digging up the burrow I found it had been deserted by the grub, which I have no doubt had travelled to the next plant, although at least six yards distant, for there I found a burrow and a recent attack upon the plant which the day before was uninjured. I now washed this also, and several others, with the solution of salt, and for ten days (during which the weather was hot and dry) no one of them received further injury until a heavy shower of rain fell, after which (as I did not wash them again) they shared the fate of all the others. In such cases it might be worth while to employ children to dig them out, for they are easily found, as may appear from my having collected upwards of thirty in less than half an hour; but the most keen searcher for and destroyer of these is the rook, and I attribute their increase in this instance to the mistaken vigilance of the farmer in shooting any one of them which ventured to set foot upon the land, and hanging him up as a warning to his brethren of the reward they would meet with for any friendly endeavours to relieve him from the ravages of so destructive an enemy as the grub. Then there is the snail and the slug, both great consumers, besides a host of caterpillars of the different kinds of moths and butterflies, the best destroyers of which are the various small birds which the farmer so ungratefully or rather unwittingly attempts to annihilate; for I believe it could be pretty clearly shown that, but for their unceasing assiduity and sagacity in the search of insects, (and which no *human* ingenuity could supply,) the whole race would multiply so rapidly as to devour not only turnips, but every other crop upon which the agriculturist depends for his subsistence.

I trust that the above observations, by pointing out many things which have failed to effect the intended object, may at least be so far advantageous as to show the fruitless expenditure of time by others who may engage in the same pursuit; and should they offer any suggestion which may lead to the discovery of a remedy for the evil, it would afford the greatest satisfaction which I could receive.

DESCRIPTION OF PLATE IV.

Fig. 1. Part of a turnip-leaf attacked by the *Haltica nemorum* 1 *a*, *a*. Tracks of the larva which are visible through the parenchyma, at the broad end of the burrow. 1 *b*. A burrow from which the larva has escaped to the ground. 1 *c*, *c*. The perfect beetles. 1 *d*, *d*, *d*. Holes drilled in the leaf by the latter.

Fig. 2. The larva magnified.

Fig. 3. The pupa, natural size. 3 *a*. The same magnified.
Fig. 4. The perfect beetle seen from above.
Fig. 5. The same, ventral aspect.
Fig. 6. The eggs of the same highly magnified.
Figs. 7, 7 *a*, and 8, 8 *a*, represent the Eggs of two Lepidopterous insects also found on turnips by Mr. Le Keux, by whom they were reared:—the first is that of *Leucophasia Sinapis*, or Wood White Butterfly; and the second, that of *Plusia Gamma*, or the Y. Moth. Fig. 7 and 8 being of the natural size, and 7 *a*, and 8 *a*, magnified.

VI. *Description of a new Irish Crustaceous Animal. By* Robert Templeton, Esq., *R.A.*

[Read September 7, 1835.]

(Plate V.)

A short time since, I received from my friend R. Patterson, Esq., Vice-President of the Belfast Society of Natural History, specimens of Irish *Crustacea*, the greater part of which, though not new to the British fauna, are yet met with but rarely, and the whole, with one exception, not recorded by my father as natives of our Irish coast. As however I have not yet had time to give them all a thorough examination, I shall defer notice of any excepting two species which present some singular peculiarities, and tend to remove in some measure the doubts which have existed as to the proper position in the scale of animated beings to be assigned to one of them; since a similarity, I conceive, may be traced between the organs of manducation in these, and in genera whose position has been correctly ascertained, sufficient to warrant their being associated: data are also offered us from whence to infer the accuracy of a surmise of the celebrated Latreille, whose sagacity and penetration stand in estimation so deservedly high, that any thing tending either to confirm or disprove his views, derive from that circumstance alone increasing interest.

The first of these specimens I imagined at first glance to be a *Nebalia;* it however proves remarkably distinct and requires the establishment of a new sub-genus. I received eight specimens, six of which have been sacrificed in the examination of the mouth, and the two remaining I forward to be placed among their congeners in the Society's collection.

Crustacea, *Briss. Lam.*
Entomostraca, *Müll.*
Branchiopoda, *Latr.*
Lophyropa, *Latr.*
Genus Cyclops, *Müll.*
(Sub-Genus Anomalocera.)

Antennæ 4. superioribus duabus multò longioribus, cujusdam qui mares existimantur dextrâ in medio tumidâ, suprà et extrà oculi pedunculum exorientibus; inferioribus, palpiformibus, virgâ minutâ ad apicem pilosâ è basi procidente, trium articulorum ultimis pilis longis curvatis instructis.

Oculus unicus, in maribus valdè peduculatus, in alteris (fœminis) subsessilis.

Corpus elongatum, sensim posticè angustatum, segmentis 6 divisum: segmento primo majore, subtriangulare, in medio lateris dente incurvato et cum rostro deorsum bifurcato et hamato, super oculum porrigente.

Cauda ultimo segmento, appendicibus duabus lamellatis quasi natatoribus instructo.

Pedes natantes pari 4. subæquales, ultimis articulis (me observante) indivisis, sed intrà cum lanceolis uno latere serratis, extrà hamis tribus. Parum ultimorum pedes in sexubus et inter se dissimiles, maris dexter articulo apicale tumido, processu obtuso quasi pollice, et digito mobili instructo, sinister unguibus tribus rectiusculis.

Anomalocera *Patersonii.*

Body elongate, contracting posteriorly, composed of several joints; the first large, sub-triangular, with obsolete sub-divisions, and a tooth on each side near the middle; rostrated anteriorly, the rostrum curving downwards and dividing into two strong curved hooks which divaricate, the eye in some, which are presumed to be males, standing out between them. The joints of the body successively diminish in extent, the last prolonging itself into lateral acuminate processes. The tail is composed of three or four joints, the last with two spatulate lamellæ, to which are articulated at the apices five long, flat, hairy lances, the outer being externally serrated and occasionally contracted in its dimensions.

The *antennæ* are four. The superior about $\frac{2}{3}$ the length of the body; in those, which I shall continue to call males, dissimilar, in the females alike, being with that on the left side of the males tapering, spiny, and numerously articulated, one articulation at the

base and those beyond the middle being distinctly marked, the rest obsoletely, and at this part the spines are very strong and are inclined slightly inwards. The right superior antenna of the male is very singularly formed, being swoln out about its middle; it is composed of nine joints, the first basal is very minute and seems more like a little jutting process carrying the antenna, than a part of that organ; the second joint is very large, longer than a fourth part of the antenna, it swells out just beyond its origin and has beneath, projecting inwards, a pinnate spine; towards its apex it gradually diminishes in diameter, and curves downwards to meet the next joint, a spine jutting out from the curvature: the next joint is very small, lobed and with pencils of hairs and a strong spine anteriorly: the fourth joint very large, obpyriform, irregular, obsoletely divided into five joints, particularly well made behind, and furnished in front about its middle with an articulated process, curved, toothed, and hooked at its extremity. Several pencils of hairs and spines project from this joint anteriorly: the fifth joint is about half as long as the last, is slightly curved, and has about thirty minute teeth ornamenting the sinus; the sixth joint is smaller, irregular, and has the basal half similarly furnished with about twenty still more minute teeth; the last three joints are minute, elongate, and subequal. The *inferior antennæ* are very short, palpiform, remote at their base, three-jointed; the first joint sending inwards and upwards a minute, elongate, clavate appendage, with long spiny hairs at its apex. The second joint is longest, and the third is somewhat triangular, deeply notched at the apex, and furnished with strong porrect spines or hairs curved toward their termination.

The *eye* in the supposed females is sessile, occupying the summit of a conical eminence; in the male it is placed on a large thick peduncle which projects beyond the hooks of the rostrum; the base of this peduncle is contracted, and is connected to the head by an articulation which admits of a slight degree of motion.

Immediately beneath and behind the inferior antennæ are the parts of the mouth and maxillary apparatus. The first in order is an upper lip, which seems thick, curved and furnished with hairs; two rounded bodies extend backwards and laterally from this, whose surface is studded with minute spatulate, serrated, or pinnated bodies, resembling thick short bristles, and precisely similar to those figured in the Magazine of Natural History for January 1834, on the maxillæ of a species of spider; between these rounded bodies is the slit-like opening of the fauces, and from their base posteriorly arises a palpus or thoracic foot, five-jointed, the second being elongate, somewhat *f* shaped, when at rest pro-

ceeding backwards, and having articulated to the apex superiorly the third joint, which is similar in form, of nearly equal dimensions, placed erect, and supporting externally a minute fourth joint: the fifth is large, tumid in its middle, and with two minute articulated processes which give origin to pencils of long, curved, hairy spines. Behind and between these appears a singularly formed body, flattish, placed longitudinally, sub-quadrangular, and with stiff spines passing forwards and backwards, and from near the posterior inferior angle a large elongate process, partially articulated to it, which proceeds downwards and forwards, spined at its apex, and carrying near its base an irregularly lunated body, with strong waved spines passing backwards from its horns. In the female specimens I detected behind the above another smaller appendage, also quadrangular, with long waved hairy spines, directed forwards and entangling with those of the last described body, and with an elongate articulated spined process from its inferior angle. I do not know whether it is to be found in the remaining specimens; but, from the exact similarity of the more obvious pieces, I have every reason to expect its existence in them. The last part, connected in any way with the organs of the mouth, lies exterior to that described above, and lies immediately beneath the posterior angle of the large ring of the body; it is very large, irregular, curved forwards with traces of articulations, the anterior margin being divided by clefts into processes, which sustain at their apices one or two long, coarse, hairy spines, arched upwards near their tips, and obviously intended to entangle the minute objects which serve as food to the animal. It may be named a thoracic foot.

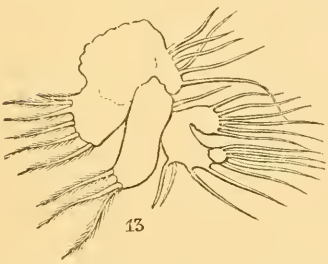
The *swimming feet* are four pairs: the fourth joint of each is flat and dilated backwards so as to be broadly triangular; the lamellate joints, which seem three in number, have two or three strong short hooks articulated externally, and flat-toothed lances internally. The last pair of feet are unlike each other and dissimilar in the sexes, if I be correct in supposing those to be females which have the undilated antenna. In the male, four articulations of the left foot project beyond the testa; the first small, somewhat elongate and curved; the second large, tumid, rounded posteriorly; the third longer, somewhat arched, with a blunt tooth at the apex, posteriorly, and the articulation for the last joint directed forwards. The fourth, or last joint, is minute, conical, and supports a very small articulated appendage, which is armed with the three claws. The right foot has in the same space only three articulations, the two basal sub-equal, swoln posteriorly; the last flat, roundish, with a blunt process anteriorly directed downwards

and resembling a little thumb, towards which approaches the apex of the long, cylindric, curved finger which is articulated to the joint behind. In the female the leg has the first joint very large, obsoletely subdivided, and by a longitudinal channel, marked out into two parts, the inner of which supports a very short bifurcate member capable of retraction, the outer the three last joints of the leg; the basal of which is elongate, nearly straight, and with a spine or long tooth near its apex. The next joint smaller and shorter, with a tooth occupying a similar position, and an elongate tapering articulated process on the opposite side. The last joint dilates a little towards its apex, giving origin to three moderate-sized teeth, and one long, flat, and toothed process directed inwards.

To the first joint of the tail is attached beneath a biarticulate spatulate appendage; it was confined to the left side of the female, and is probably a collapsed ovary.

Length, 0.12 inch.

PLATE V.*



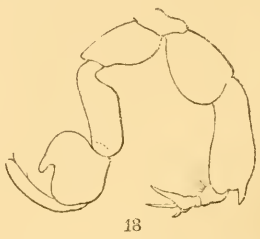


Fig. 1. Represents the male magnified, the parts of one side only are represented except the tumid antenna, the more anterior of the last pair of legs, and a process beneath the tail which belong to the opposite side.

Fig. 2. The female.

Fig. 3. The same specimen seen from above.

Fig. 4. The appearance of the left antenna of the male, and both of the female.

Fig. 5. The right antenna of the male.

Fig. 6. The inferior antenna, with the minute branch set off from the base.

Fig. 7. This minute branch still more magnified.

Fig. 8. The head seen from beneath. Anteriorly the basis of the antennæ with the rostrum curving down between them and splitting into its two hooks. The sessile appearance of the eye in the female, next in order. And lastly, the mouth, with the lip, mandibles, and palpus.

Fig. 9. These parts of the mouth seen in profile.

* Figs. 13 and 18 have been introduced as wood-cuts, there not being sufficient space for them in the plate.—Sec. E. S.

Fig. 10. One of the hairs greatly magnified.
Fig. 11. The terminal joints of the palpus, as seen sidewise.
Fig. 12. The same seen from behind.
Fig. 13. The third pair of appendages to the mouth, seen sidewise.
Fig. 14. The first leg, or last appendage to the mouth, seen laterally.
Fig. 15. A body, the exact position of which I could not ascertain, but believe that in the female it lies between the pair fig. 14., and behind those marked fig. 13. The minuteness of the animal rendered it impossible to ascertain the point clearly. The moment the separation of the parts No. 14. was effected, I found this, but could not tell where it came from; it is perhaps basally attached to No. 14.
Fig. 16. One side of the tail and the swimming feet beneath, seen from above.
Fig. 17. The underside of the terminal joint of the right last foot.
Fig. 18. The last pair of legs in the male.
Fig. 19. The last pair of legs in the female.
Fig. 20. The apical joint still more magnified.
Fig. 21. Form of the fourteen minute teeth on the long process.
Fig. 22. An appendage to the first joint of the tail in a female specimen only observed on the left side—it may have existed on the other—and is most probably a collapsed ovary.

My friend Mr. Patterson has furnished me with the following interesting particulars in a letter which accompanied the specimens. "The sketch I send you is a very rude representation of a small *Crustacea*, five or six specimens of which are sent on a card. The drawing has no pretensions to accuracy except so far as the antennæ are concerned, and in these the anomaly of two distinct forms made me delineate them with as much accuracy as in my power. This difference is not perceptible in all the specimens. The rostrum in the part which is inked (Note.—This refers to the pedunele of the eye) is a dark blue. The colour of the animal is itself a bright green, mottled with darker shadings; the green colour is very fugacious, and observable only in the recent specimens. The antennæ are covered with numerous small hairs. The feet beautifully fringed and formed for swimming. * * * * The first time on which I took any of these was in crossing the ferry, at the mouth of Larne Lough, county Antrim, in the evening of the 2nd of May. They were so numerous, that in the space of about fifteen minutes above three hundred were taken. Though kept in a glass jar of sea-water they all died during night, and were almost colourless next morning. The ensuing day I passed the ferry, but only took four specimens. These I lost, as well as some of those of the previous evening, by having *Beroes* in the same vessel. The fact of the *Beroes* feeding on small *Crustacea* has been recorded by Fabricius, and at present appears to rest on his authority. It was interesting to *observe the fact*, which I did without

knowing it was previously known.* The *Crustacea* were almost as visible in the transparent body of the *Beroe* as they had previously been, and very conspicuous by the bright green of their colouring. From the 3d of May I was almost daily using my towing net, yet did not take another specimen of this animal until the 16th of the same month; on that day I took sixteen of them, but was at the time on the point of starting for Belfast, and had only leisure to make the rude drawing I have given, and attach the specimens hastily to cards.

"They swim with a lively and constant motion, and jerk themselves out of the way when pursued. I am anxious to know what they are, as they form a portion of the food of a tentaculated *Beroe*, which differs in many respects from the description and drawing of the *Beroe Pileus* given by Dr. Grant, and which I am at present inclined to regard as a distinct species."

(The descriptions of the other Species alluded to in the introductory remarks will appear in the next Number.)

VII. *Notes respecting the Variety of the Silk-Worm which spins white Silk. By* W. Sells, *Esq., M. E. S.*

[Read November 7, 1836.]

As I was desirous of giving some attention to the history and economy of the new variety of silk-worm, the eggs of which were stated to have been imported from China, and were distributed among some members of the Society at their June meeting, I made some notes from day to day, a copy of which is now submitted to the notice of the Society.

June 7.—The eggs began to hatch on the evening of their distribution, and the young worms were all out in the course of eight or nine days; as mulberry-leaves were easily procured in abundance, and they were regularly fed, they throve remarkably well, and arrived at maturity by the last week of July.

August 4.—The worms have been spinning their cocoons of perfectly white silk during the last week; they are decidedly larger than those of the common sort, and vary much in figure, several being nearly spherical, others cylindrical,

* M. Risso mentions his finding *Phronima sedentaria* in the interior of a *Beroe*.

with the ends rounded, and some of them rather contracted in the middle; the loose or floss silk is inconsiderable, the cocoons are less easily wound off and do not yield quite so much of the material, but the silk is beautifully soft and fine in texture.

August 27.—The moths commenced making their appearance, and came out in succession during the following ten days.

September 14.—The first pair of moths died, and by the 29th all of them were extinct, so that the whole average period of the insect's existence, from the hatching of the egg to the death of the imago, was one hundred days.

The business of impregnation in the silk-worm is very slowly effected, and requires a repetition of intercourse between the sexes to complete the process of fertilizing the whole mass of ova. Several pairs of moths were placed separately in trays, and covered with gauze to prevent escape, the better to observe the results correctly. One pair, which coupled on Wednesday the 7th of September, were found united on the 16th, having however been separated during the ten days more than once, for a short period, when the female laid a number of eggs,—on the 17th they parted finally; the male died on the 20th, and the female on the 24th, after having deposited 796 eggs.

In another case the coitûs continued 60 hours, when the female laid 150 eggs; she then recoupled, and remained so during two days.

In a third instance the union lasted above 72 hours, when they were found apart, but oviposition had not commenced.

The worm is slightly distinguishable from that of the long domesticated variety by a blackish spot on each side of the head; the moth is perhaps somewhat larger, and the dark lines on the wings rather more deeply coloured.

It appears very questionable whether this variety of the insect could be advantageously cultivated, as the silk is not of quite so strong a texture, is less in quantity, and not wound with the same facility as that of the common sort; at the same time it would be injudicious to pronounce what might prove to have been a premature opinion, as further careful investigation may show that the white silk is better adapted to particular purposes in manufacture than the orange and the pale yellow sorts are. I would, therefore, recommend a further and more extended cultivation of the white variety, in order to ascertain if the present apparent objection may not in some measure be overcome, and that we do not hastily despair of its available usefulness.

VIII. *On the Golofa Beetle of Venezuela and its allied Species.* *By the* Rev. F. W. Hope, *M. A. F. R. S., &c.*

[Read March 7, 1836.]

Ordo COLEOPTERA, *Linnæus.*

Divisio Lamellicornes, *Latreille.*

Familia Dynastidæ, *Mac Leay.*

Genus Golofa. Tab. VI.

Labrum distinctum, emarginatum (sub clypeo haud latitans), valdè ciliatum. (Fig. 2.)

Mandibulæ validæ falcatæ, subtus canaliculatæ, edentatæ, intus basi lanatæ. (Fig. 2.)

Maxillæ elongatæ, lobo apicali attenuato, intus denticulato, ciliato.

Palpi maxillares 4-articulati; articulo 1mo et 3tio subæquales, 2do paullo longiori, 4to elongato, attenuato. (Fig. 3.)

Palpi labiales 3-articulati; articulis duobus primis æqualibus, brevissimis, 3tio longiori, obovato. (Fig. 3.)

Mentum breve, transversum.

Labrum lageniforme, hirsutum.

Antennæ 10-articulatæ, et ferè ut in *Megasomate*, Kirby, formatæ. (Fig. 4.)

Corpus oblongum, maris caput cornu recurvo, valdè serrato.

Thorax cornu erecto, antrorsum piloso armatus.

Pedes anteriores maris longissimi, arcuati; ultimo articulo tarsorum extus piloso. (Fig. 5. Tip of tibia. Fig. 6. Part of tarsus.)

Obs.—The beetle first described below I am disposed to make the type of a new genus, to which I have given the name of *Golofa*, or Sawyer-Beetle, that being the provincial name under which it is known to the natives of Venezuela. *Golofa Incas*, *Hope*, a new species from Mexico, appears closely allied to it. *Scarabeus Claviger*, and *hastatus*, both described by Fabricius, belong to the same group; a third Fabrician species, namely, *S. Ægeon*, described by Olivier as inhabiting the East Indies, in my opinion* is to be referred to this genus. I am even inclined to doubt the locality given by Olivier, whose authority can seldom be depended upon. There are also two new species which I have added to this genus, namely, *Golofa Pizarro* and *Guildinii*, the former abundant in Mexico, the latter not unfrequent in the Isle of St. Vincent.

* Subsequently confirmed by information communicated by W. S. Mac Leay, Esq. (Sec. E. S.)

Species 1. *Golofa Porteri.* Plate VI.

Long. lin. 29, lat. lin. 14.

Rufo-castaneum, antennis nigris, capitulo rufo-piceo. Capitis cornu recurvo, valdè serrato, longitudine elytrorum ferè æquali. Thorax cornu erecto simplici armatus, antrorsum piloso. Scutellum rufum, nigro-marginatum, punctatum. Elytra castanea, punctatissima, sutura, marginibus atris. Corpus infrà piceum, hirsutie fulvescenti obsitum. Pedes nigri, anteriores longissimi, tibiis subtus canaliculatis, 3-spinosis, ad apicem 1-calcaratis, rufo-pilosis; pedes postici bicalcarati.

Fœmina adhuc latet.

Obs.—This remarkable insect was taken at Venezuela by Sir Robert Kerr Porter, in whose honour it is named. It was presented by him to the United Service Museum, and by the kindness of Captain Henry Downes was sent to me to be described.

Species 2. *Golofa Incas* ♂, Hope.

Long. lin. 18, lat. lin. 10.

Pallidè castanea, antennis nigris, capitulo rufo-piceo. Capitis cornu nigrum, apice recurvum, acutum, retrorsum subcanaliculatum, subdenticulatum. Thorax cornu erecto brevi, apice acuto, hirsutie fulvescenti obsito. Scutellum nigrum, sparsè punctatum. Elytra punctulata, testaceo-castanea, sutura, marginibus atris. Corpus infrà nigro-piceum, hirsutie fulvescenti obsitum. Pedes anteriores longissimi, rubro-picei, tibiis 3-spinosis, ad apicem unicalcaratis. Pedes postici bicalcarati, nigri, femoribus rubro-piceis.

Golofa Incas ♀.

Long. lin. 17, lat. lin. 9½.

Caput nigrum, in medio armatum. Thorax rubro-castaneus, varioloso-punctatus. Elytra castanea fortiter punctata, tribus lineis flavis in singulo apparentibus, pedibus anticis hirsutie fulvescenti carentibus.

Habitat in agris Mexicanis.

Species 3. *Golofa Ægeon*, Fab. Oliv. *Scar.* pl. 26, fig. 219.

Long. lin. 14½, lat. lin. 7.

Scutellatus rufus, thoracis cornu brevi, incurvo, subtus barbato, capitis cornu subulato.

Fab. Sys. Ent. p. 4, n. 4.

Obs.—This insect I purchased at the sale of the collection of Mr.

Lee of Hammersmith, and as it was named by Fabricius himself, there cannot exist a doubt respecting the species. The general appearance of *G. Ægeon* resembles *Golofa Porteri;* it is, however, the smallest known species of this group.

Species 4. *Golofa Claviger*, Fab. *Vid.* Oliv. *Searab.* pl. 5, fig. 40 a, b.

Scutellatus rufus, thoracis cornu elevato, capitis subulato, recurvo. *Lin. Sys. Nat. Man.* p. 529.

Inhabits Cayenne.

Obs.—It is reported that this species is found in ants' nests; probably they merely seek concealment during the day-time in such localities.*

Species 5. *Golofa Hastatus*, Fab. *Vid.* Oliv. *Sear.* pl. 19, fig. 175.

Scutellatus, thoracis cornu brevi, fornicato, hastato, subtus hirto, capitis recurvo. Vid. *Fab. Sp. Ins.* tom. 1, p. 6, no. 11, &c.

Obs.—This insect is not at all uncommon in the continental collections, and generally bears the name of *S. hastatus*, Fab., and is thought by some to be a variety of *G. Claviger*, which I am inclined to doubt, as the thoracic horn differs considerably from the former; there is also a difference in the general sculpture and punctation of the elytra.

Species 6. *Golofa Pizarro*, Hope.

Long. lin. 16, lat. lin. $7\frac{1}{2}$.

Rufo-castaneus, capitis cornu simplici, recurvo, thoracis cornu erecto, incurvo, apice subtrilobo, subtus excavato et piloso. Corpus infrà nigro-piceum, hirsutie fulvescenti obsitum, femoribus piceis, tibiis tarsisque nigricantibus.

Habitat in agris Mexicansis.

In Museo Dom. Hope.

Obs.—This species approaches in the form of its thoracic horn to *G. Claviger;* in other respects, however, it is more closely allied to *G. hastatus*, Fab.

Species 7. *Golofa Guildinii.*

Long. lin. $16\frac{1}{2}$, lat. lin. 8.

Scutellatus atro-rufo-castaneus, capitis cornu simplici; thoracis-

* From information communicated by Mr. W. S. Mac Leay there appears to be no foundation for this statement. It is, however, here retained in consequence of a similar locality being occasionally selected by the larvæ of certain *Cetoniæ*.

que cornu elevato, apice subtrilobo, subtus excavato, piloso ; corpore subtus sparsim subpiloso, pedibus nigricantibus.

Habitat in Insulâ Sancti Vincentii.

In Museo Dom. Hope.

Obs.—This insect was first sent to England by the late Rev. Lansdown Guilding, whose unwearied researches in every branch of zoology, I regret to state, have not as yet been sufficiently estimated by his countrymen.

IX. *Observations and Experiments for excluding the House and other Flies from Apartments, by means of Nets. By the* Rev. E. Stanley, *now Lord Bishop of Norwich. Communicated by* Colonel Sykes.

[Read April 4, 1836.]

In a paper read on April 7, 1834, at a meeting of the Entomological Society, by William Spence, Esq., on the Italian mode of excluding the house-fly, some doubts seemed to be entertained as to the correctness of the facts, and the attention of observers was requested to so singular a discovery. In the course of the last summer I accordingly had some nets prepared of different coloured worsteds, red, yellow, &c., the size of the meshes varying from $\frac{3}{4}$ to one inch on the side of the square. These were stretched over the two windows of the room in which I constantly sat in the morning, much exposed to the troublesome intrusion of flies, particularly that most annoying species, the blue-bottle (*Musca vomitoria*), attracted to the spot by a trellis covered with the sweet-scented clematis, honey-suckles, and other flowering plants. So great indeed was the annoyance occasioned by the numbers buzzing about the room, that on the hottest days I was obliged to forego the luxury of admitting the air, by even partially raising the saches. But no sooner had I set my nets, than I was relieved from my disagreeable visitors. I could perceive and hear them hovering on the other side of my barriers ; but though they now and then settled on the meshes, I do not recollect a single instance of one venturing to cross the boundary. To convince myself that this disinclination on their part was not accidental, depending on the state of the air or mere caprice, I repeatedly withdrew one of the

nets or opened a door communicating with an adjoining room having a similar aspect, when in the course of a few minutes three or four would enter, and singularly enough I found some difficulty in driving them out, as almost invariably they flew with violence against the upper panes, cautiously avoiding the net-work below, through which, had the free current of air been their guide, they might easily have escaped. Encouraged by this first attempt, I prepared a net of very fine pack-thread, with enlarged meshes of $1\frac{1}{4}$ inch to the square, and to my great satisfaction found that it answered the purpose as effectually as the smaller worked coloured worsted nets. So fine and comparatively invisible was the pack-thread net, that there was no apparent diminution of either light or the distant view, and for the remainder of the summer and autumn I was enabled to enjoy the fresh air with open windows without fear of the annoyance I had heretofore experienced. I should also add that, though wasps occasionally came through, the number was very much diminished. I attribute this valuable effect of net-work to the highly magnifying power of the organ of vision, added to the small focal length of the lens of the eye; in consequence of which, the enlargement of each thread in their rapid flight presents a succession of obstacles not discernible in the solid obstruction of the panes of clear glass, against which they strike with the full force of accelerated motion when endeavouring to avoid the attempts of those who would catch them.

X. *Observations on Succinic Insects. By the* Rev. F. W. Hope, *M.A., F.R.S., &c.*

PART THE SECOND.

GUMS AND RESINS.

[Read April 7, 1834.]

In commerce the term gum is indiscriminately applied to resins as well as to gums, and we not unfrequently meet with the following improper appellations, *Gum Copal, Gum Animè,* both of which are resins. It is true, indeed, that these substances have some properties in common which are not at first sight readily perceived;

they are, however, on analysis, sufficiently distinct, and it is desirable that we should apply the terms properly. The chief gums imported into England are those of Arabia and Senegal, besides various others of inferior qualities from different quarters of the globe. None of them which have come under my notice contain insects, nor can I learn, by investigation or inquiry, if they have been observed by others in like substances.* Resins differ from gums in being insoluble in water; but, with some few exceptions, are soluble in alcohol, especially if assisted with heat. The only resins to which I wish to draw your attention, are those named *Copal* and *Animè*, as they are the only resins which are reported to contain insects.

Copal.

Copal appears to be the Mexican term for gum, and is applied by the South Americans indiscriminately to all odorous gums as well as resins. It is said to be imported *partly* from South America, and *partly* from India, and the tree which produces it in New Spain, according to Piso, is the *Hymenæa Courbaril.* It is probable also that other species of *Hymenæa*† produce *Copal*, as it is obtained from various parts of South America, and varies greatly in colour and specific gravity. It is a matter of doubt with me if *Copal* is ever found in the East Indies, as I think invariably it has been confounded with *Animè*, a substance closely resembling it. *Copal* is found in rounded lumps of a moderate size, and is reported, like amber, to contain insects‡ imbedded in its substance; as far, however, as I have had any opportunity of examining it, (sometimes in large quantities,) I have never yet met with insects inclosed therein. In support of the above opinion, that *Copal* contains no insects, I add the testimony of Mr. Strong of Long-Acre, one of the first varnish-makers in London, whose attention has long been directed to insects contained in resins, and his unique and superb collection (the result of fifty years' labour) affords no

* My friend Colonel Sykes certainly possesses a small snake entangled in gum arabic, which he removed from the tree (*Mimosa Arabica*) himself; and insects of course may be entangled in a similar manner; but it is probable they will rarely, if ever, be found in masses which fall to the earth, since, from the soluble nature of gum, they would necessarily be dissipated by successive showers.

† Hernandes describes eight species of trees producing *Copal.*

‡ Observe, I do not assert that South American *Copals* never contain insects. I think it probable they may; up to the present moment, however, I have not been able to prove it. Should they eventually be found in it, I have little doubt that the insects will indicate the American type, as those of *Animè* exemplify the Indian form.

specimen of *Copal* containing insects. If this opinion prove true or not, the analysis of *Copal* given by Berzelius probably belongs to *Animè*, and the insects described by Dalman, as found in *Copal*, belong to *Animè* also. In corroboration of this opinion I have only to add, that out of fourteen genera of *Copalic* insects described by Dalman, I have found nine in *Animè*, generally the same species, and particularly that singular insect, named *Paussus cruciatus;* the remaining five are very minute, and may have escaped my notice. I conclude, however, that the substance named *Animè* is the same as the *Copal* of Dalman, and in order to prevent further confusion, I restrict the term *Copal*, originally a South American word, to American resin.

Animè.

Animè, improperly denominated *Gum Animè*, is a resinous substance, which exudes from the *Vateria Indica*, a gigantic tree of Malabar. It is sold, according to a communication which I received from Dr. Royle, in the bazaars of India, under the name of *Sundroos*. In northern India it is said to be the produce of a tree of Manwar, one of the provinces of central India. Abundance of resin exudes from this tree in its native soil, and, when recently found, it varies from pale green to a deep amber, with all the intermediate shades. As there are various species of *Hymenæa* which produce *Copal*, so probably other genera of *Dipterocarpeæ* yield *Animè*. The *Trachylobium Gærtnerianum* of Heyne, a native tree of Madagascar,* produces it in great abundance. The *Animè* which is usually exposed for sale in the lower provinces of Hindostan, is obtained in the vicinity of the mountains of Travancore, and the enormous forests of the Malabar coasts are said to yield it in great profusion. The term *Animè*, Piso informs us, was first used by the Portuguese, and it appears to be only another name for the resin of the *Jetaiba* tree, which they gave it in consequence of its close resemblance to the *Animè* of New Spain. The *Jetaiba* tree

* I have received some specimens of *Animè* from Madagascar replete with insects of various orders; and, as very little is known respecting the Entomological character of that island, I scarcely dare hazard an opinion concerning it. From the few forms, however, which have fallen under my inspection, I should say that the genera of Africa and Asia are greatly intermingled in this island, those of the former rather predominating. Asiatic types also are not uncommon. Several species of *Elateridæ* from Madagascar appear closely to resemble those of Travancore. Should it hereafter appear that the botany of Madagascar and the southern parts of the Mysore is similar in character, we may naturally expect a proportionate accordance in their Entomology, at least in those groups which derive their food from vegetation.

is a species of *Hymenæa*, as is the *Animè* tree of New Spain. Here, I think, I can trace the origin of all the confusion respecting *Animè* and *Copal*. The Portuguese first gave the name of *Animè* to the resin of Malabar, probably from observing insects imbedded in its substance, calling it *Animè*, or "*animated*," which is the signification of the Lusitanian word. The Portuguese, from their early acquaintance with the Malabar coast, which commenced in 1498, soon discovered the *Animè*, as it is scarcely possible one of its chief products should not have become early known to people of their keen commercial habits, more particularly so as they were at that period a flourishing trading people. This same people did not settle in South America till 1549, a period of fifty-one years having elapsed since their first intercourse began with India. The resin of New Spain, presenting a similar substance to that of the Malabar coast, had the same name applied to it, without any regard being paid to the tree which produced it; thinking this account not improbable, I would infer from it, first, that the name of *Animè* was misapplied to *Copal*, which is only found in America; and secondly, that the original term *Animè* was applied to the produce of Asia. In process of time *Animè* and *Copal* were considered as synonymous, and as the Spaniards and Portuguese traded with the East, they afterwards gave the name of *Copal* to the *Animè* of India, which is equally erroneous, *Copal* being only found in the New World, while *Animè* is the produce of the Old. *Animè* contains imbedded in its substance lizards, shells, insects and vegetables, and sometimes, like amber, it is found with drops of water. The lizards, on the authority of Mr. Bell, I state to belong to the genus *Hemidactylus;* they appear, however, to differ from any in his unrivalled collection. The only species of shell which I have seen belongs to the genus *Cyclostoma;* it has an elevated ridge round the centre, and it appears to be exceedingly rare, if not unknown. The lizards and shell are in Mr. Strong's collection. The number of genera of insects which have come under my notice amount to 155; there are also various others in all orders of very singular and undescribed forms, affording an ample field for the future researches of the entomologist,—a field where scarce a track is yet explored.

The plants which are found in *Animè* appear to belong to the following genera, viz. *Mimosa*, *Shorea*,* and *Hemicyclia*. There are also various others which I willingly leave to the researches of the

* Mr. Don is of opinion, that some leaves contained in *Animè* resemble those of *Shorea robusta*.

botanist, as it is properly his department. I cannot quit this part of my subject, however, without expressing a wish that some one may direct his attention to the investigation of the plants found in *Animè* and amber, as it may eventually lead us to the knowledge of the antediluvian tree which produced the latter. It may here perhaps not be amiss to hazard a conjecture how the insects became enveloped in the *Animè*, and I do so with the hope that my remarks may lead others to investigate a subject which can only satisfactorily be done by persons residing in the country where the resins are produced. The *Animè* in some cases appears to have exuded from the tree in considerable quantities and at different times. It trickled in drops on the ground, and is found in a mass sometimes of 7 lbs. weight. It is of various sizes and forms, not unfrequently assuming that of stalagmite: and I possess a stalactite which contains a portion of the branch to which it was suspended. In some specimens laminæ or layers are observable, appearing like flaws in minerals; where this is the case, the liquid resin probably fell on the previously indurated fluid, as they readily break in the direction of the flaws. The liquid *Animè* appears to have formed on the ground an heterogeneous mass with the mixture of earth, sand, and vegetable matter, sometimes enveloping pieces of stick, leaves, and blossoms of flowers, &c.; it remained some time concreting, and was at length hardened by the influence of the sun and air. While liquid the wandering lizard, probably in search of the very insects we find imbedded, became entangled in the viscous fluid; the land *Helix*, crawling over it, was arrested in its progress; and the fallen leaf, partly adhering to the mass below, became perfectly enveloped from successive drippings from above. Supposing the *Animè* to have flowed down the trunk of the tree, it would naturally embalm in its precious resin every thing in its progress. If such were the case, we should then expect to find *Lichens*, cortical and subcortical insects, embedded in it; in other words, the *Xylophaga*, as well as other *Xylobious* insects, in profusion. *Such* we do *find*, and *find them in numbers* far surpassing our expectations. How, however, are we to account for the presence of *Orthoptera*, *Lepidoptera*, various genera of *Hymenoptera*, and numerous *Diptera?* Whilst the *Animè* remained liquid, the locust, cricket, and *Cicada* may have alighted on the glutinous bark. The *Lepidoptera* and some of the *Hymenoptera* may have mistaken the *Animè* for honey, particularly if the resin yielded a fragrant and aromatic odour, as insects are endued with an extraordinary sense of smell, and are easily attracted by sweets;—finding *Apidæ* in great abundance, it is probable that an aromatic

odour attracted them. As to *Diptera*, clouds of gnats may have been driven by the wind against the bark, and various genera of flies, seeking their usual evening resort, the sunny side of trees, may have settled on the resin, stuck fast, and perished in the same common grave. In many instances the *Animè* appears to have *indurated almost instantaneously*, and from the perfect state in which we find the insects, we may conclude that they perished almost without a struggle. In proof of which, we find *Gryllus* in the attitude of springing, *Acheta* arrested in its flight, the wings still expanded, and *Brentus* surprised almost in the act of copulation. In short, the attitude of life is admirably preserved even after death, and, like the figures in the *Sleeping Beauty*, they seem to have been suddenly arrested in their several avocations, and appear ready to awake from the cataleptic lethargy which entranced them, though a century had passed away.

In conclusion, I have only to add how vastly superior (in these instances also) the works of nature are to the operations of art, greatly as the latter are often extolled, almost at the expense of the former. Look at the insect in its amber shroud, and then at the most perfect specimen of Egyptian mummy. In the *one*, we see the beauty of the original preserved, and its colouring increased, whilst it is embalmed in a more durable and precious covering than has ever fallen to the most magnificent of monarchs. In the *other*, we see a body "once pregnant with celestial fire," retaining still the form and lineaments of man, though now a ghastly spectacle, loathsome to the eye, and offensive to the smell, and while we gaze on the distorted visage, the emaciated and collapsed body of the Egyptian, we can scarcely do otherwise than imagine—

"The pangs he suffered, and the death he died."*

I hope I have shown from this imperfect sketch of Succinic Insects, that the Science of Entomology involves collateral considerations of a very high interest; and, although it will probably never attain to the brilliant renown which its sister sciences have reached, still it may be rendered eminently useful and instructive, which should ever be the chief end of all scientific pursuits.

* Vide *Boone's Farnese Hercules.*

Description of various New Species of Insects found in Gum Animè.

(Plate VII.)

Ordo COLEOPTERA.

Familia Staphylinidæ.

Sub-Familia Oxytelides.

Osorius brunnicornis, Hope. Fig. 1.

Long. lin. $4\frac{3}{4}$.

Niger, nitidus, tibiis anterioribus dilatatis, antennis pedibusque brunneis.

Corpus cylindricum, nitidum, nigrum.

Caput elongatum, mandibulis intus dentatis.

Antennæ brunneæ, pubescentes, capite longiores; 1mo articulo basi contracto, apice dilatato; 2ndo minori; 3tio præcedenti longiori; septem sequentibus æqualibus; extimo ovato, antice subconico. Fig. 1 *a*, 1 *b*, terminal joints of max. palpus.

Thorax fere quadratus, capite brevior, lævis.

Scutellum 3-angulare, magnum.

Elytra thorace longiora, parum latiora, nigra, nitida, marginibus posticis brunneis.

Pedes rufo-brunnei; tibiis anterioribus dilatatis, compressis, spinulosis.

E Resino Animè descriptus.

In Musæo Dom. Strong.

Familia Pselaphidæ.

Temnodera.*

Antennæ 11-articulatæ, articulo 1mo crasso, 2do paullo minori; 6 sequentibus fere æqualibus, subtrigonis; binis proximis sensim magnitudine increscentibus, lunulatis; ultimo elongato-ovato, apice conico.

Palpi 3-articulati? articulis duobus primis æqualibus, tertio præcedentibus vix duplo longiori, elongato-ovato, apice attenuato. Fig. 2 *a*.

Caput protensum, antice attenuatum, postice dilatatum, nodosum.

Thorax rotundatus, postice semicirculariter, forte impressus.

Elytra ovata, postice abrupte truncata.

Abdomen subovatum, gibbosum, longitudine elytris haud æquale.

Pedes longissimi, femoribus rectis subincrassatis, tibiis tarsisque gracilibus.

Temnodera testacea. Fig. 2.

Long. lin. 1.

Totum corpus supra et infra rubro-testaceum, thorace globoso,

* From τέμνω, scindo, and δέρα, collum.

superne inciso; elytris ovatis, abrupte truncatis, pedbus longissimis.

Obs.—It is difficult to describe the above insect accurately, from the refraction of the resin. It differs in many respects from any known genera; and from the singular thorax, which appears as if it had been submitted to the knife of the anatomist, I have given it the name of *Temnodera*. The thorax resembles closely the ball and socket.

Familia Elateridæ.

Mecynocanthus unicolor. Fig. 3.

Long. lin. 6.

Ruber, thoracis angulis anticis et posticis in spinas productis.
Antennæ retractiles.
Thorax punctatus, scutellum latum, postice rotundatum. Fig. 3 *b*.
Elytra punctato-striata, apicibus valdè acutis.
Tarsi articulo quarto subdilatato. Fig. 3 *a*.

Habitat in India Orientali.

Specimen unicum in Resino Animè inclusum.

Obs.—This remarkable insect is in Mr. Strong's superb collection. As it differs from all the *Elateridæ* in the singular form of the thorax, I have given it the name of *Mecynocanthus*, from μηκύνω, and ἄκανθα, from its thoracic angles being produced into spines.

Ctenicerus eximius. Fig. 4.

Long. lin. 6.

Sanguineus, thorace linea media dorsali nigra, elytris bimaculatis apicibusque concoloribus.

Caput rubrum, antennis pectinatis, atris. Thorax sanguineus, linea media longitudinali nigra, ante oculos terminata. Regio scutelli nigra. Elytra punctato-striata, sanguinea, medio macula nigra, fere ovata, subobliqua notata, apicibusque concoloribus. Pedes nigri. Fig. 4 *a*, tarsus.

Fœmina adhuc latet; forsitan ad genus *Ctenicerum* amandandus.

Obs.—This insect approaches in its form *E. melanocephalus*, Fab. which is found on the Coromandel coast. I have no doubt that eventually it will be discovered in a recent state. A species, closely allied to it, found in Madagascar, is described by Dr. Klug.

Elater Wallesii. Fig. 5.

Long. lin. $2\frac{1}{2}$.

Niger, thorace punctato, elytris 6-maculatis, pedibusque rubris.

Antennæ nigræ, thorace antice lato, punctatissimo, angulis pos-

ticis flavis. Elytra punctato-striata, nigra, macula flava in singulis ad basin posita, binisque fasciis interruptis concoloribus, haud ad suturam extensis; pedibusque rubris.

Obs.—This elegant species of *Elater* I have named in honour of Mr. Wallis, to whose liberality I am indebted for several *Coleoptera* found in Resin *Animè*. Fig. 5 *a*, represents the terminal joints of its antennæ.

Familia Cleridæ.

Tillus 9-maculatus. Fig. 6.

Long. lin. $3\frac{1}{2}$.

Niger, elytris albo-maculatis, pedibusque flavis.

Antennæ brunneæ, (fig. 6 *a*,) capite thorace punctatis pubescentibus.

Scutellum niveum.

Elytra basi parum latiora, apice rotundata, striato-punctata, octomaculatata, quatuor maculis albis in singulo rotundatis, scutelloque concolori.

Pedes testacei. Tarsorum anteriores articuli fere æquales, subtrigoni, articulo ultimo subbilobo. Fig. 6 *b*.

E Resino Animè descriptus.

In Coll. D. Strong.

Stigmatium 2-fasciatum. Fig. 7.

Long. lin. $3\frac{1}{2}$.

Rubro-flavus, antennis pubescentibus, elytrisque bifasciatis.

Antennæ rufo-testaceæ, pubescentes. Thorax fere orbicularis, medio incrassatus, elevatus, sparsim flavo-pilosus. Elytra thorace triplo longiora, apice rotundata, striato-punctata, fascia alba fere media, secunda concolori ante apicem locata. Pedes rubro-testacei. Tarsorum articulo primo, tertio fere æquali, secundo longissimo, quarto subbilobo. Fig. 7 *c*.

In Coll. D. Strong.

E Resino Animè descriptum.

Fig. 7 *a*, apex of the maxillary palpus; 7 *b*, labial palpus.

Familia Brenthidæ.

Brenthus nasalis, Hope. Fig. 8.

Long. lin. 5.

Rufo-cinnamomeus, antennis extrorsum crassioribus, elytris striato-punctatis.

Antennæ rufæ, ultimis articulis sensim increscentibus.

Caput læve, mandibulis cultriformibus instructum.

Thorax cylindricus, glaber.

Elytra thorace longiora, striato-punctata.

Pedes rufo-picei, femoribus incrassatis.

E Resino Animè descriptus.

In Mus. Dom. Strong.

Obs.—This elegant species of *Brenthus* is one of the most singular insects hitherto discovered in *Animè*. It does not accord with the description of any species mentioned by Schonherr. It approaches very closely some species which I have received from the Mysore.

Familia Endomychidæ.

Eumorphus castaneus, Hope. Fig. 9.

Long. lin. $3\frac{1}{2}$.

Castaneus, thorace quadrato, elytris concoloribus, macula irregulari flava notatis, pedibus nigricantibus.

Elongato-ovatus, lævissimus, castaneus.

Antennæ nigræ, capite thoraceque longiores, tribus ultimis articulis rufescentibus. Fig. 9 *a*, 9 *b*, mouth.

Thorax fere quadratus, antice valdè sinuatus, marginibus pallidis.

Elytra castanea, basi thorace latiora, et fere triplo longiora, maculâ irregulari flavâ notata.

Pedes nigricantes, tarsis rufescentibus. Fig. 9 *c*.

E Resino Animè descripta.

In Museo Dom. Strong.

Ordo HYMENOPTERA.

Familia Proctotrupidæ.

Calotelea, Westw. (*Teleadi affine.*)

Caput rotundatum, ocellis distinctis instructum.

Antennæ 12-articulatæ, articulis 6 et 7 minutis, transversis, reliquis 5 clavam elongatam formantibus. Fig. 10 *a*.

Thorax ovatus.

Alæ longæ, ramulo stigmaticali brevi, fere inconspicuo.

Abdomen plus minusve elongatum, articulis subæqualibus, anticè et posticè attenuatum, basi in uno sexu in cornu erecto, supra metathoracem protenso, interdum producto.

Pedes longi, femoribus paullo incrassatis, tarsis 5-articulatis simplicibus.

Obs.—In Mr. Strong's Collection of Resin Insects several of this species are preserved, together with other specimens agreeing with them in the colours of the body and wings, and the structure of the antennæ, but having the head larger, and the abdomen shorter and unarmed at the base. From analogy with the allied genera, the latter must be the females of another species, and not the opposite sex of the one here figured, (which is a female,) as might be inferred from the colouring and markings of the wings.

Calotelea aurantia, Hope. Fig. 10.

Luteo-fulvescens, oculis, ocellis, antennarum clavâ, maculis 4 abdominalibus lateralibus, apiceque abdominis nigricantibus. Alæ anticæ fasciâ tenui medianâ, secundâ latiori, pone medium, et apice fuscis.

Long. corp. lin. 1.

In Mus. Dom. Strong.

Calyoza, Westw. (*Bethyllo affine.*)

Corpus elongatum, depressum. Caput magnum, planum (fig. 11 *b*). Ocelli postici. Antennæ prope os insertæ, ♂ 12-articulatæ, (inde inter *Hymenoptera* aculeata fossoria, hoc genus non locandum,) ramo longo gracili ex articulis singulis 3—11 producto (fig. 11 *a*). Collare magnum, subquadratum. Alæ sat breves (in specimine viso contortæ), stigmate magno, areolâ unicâ marginali ad apicem nervo tenuiori terminatâ; areolis 2 basalibus elongatis, subcostalibus, quarum superior nervo obliquo, et inferior transverso inclusæ sunt (fig. 11 *c*). Femora subincrassata, genitalia mascula in specimine exserta.

Calyoza staphylinoides, Hope. Fig. 11.

Nigra; antennis, segmentis duobus apicalibus abdominis genitalibusque lætè rubris, alis pallidis, nervis fuscis, stigmateque nigro, pedibus nigris, geniculis tarsisque piceis.

Long. corp. lin. $2\frac{3}{4}$.

In Mus. D. Strong.

Ordo HEMIPTERA.*

Familia Reduviidæ.

Enicocephalus nasalis, Hope.

Vide Art. IV. p. 22, for the description of this species.

Ordo HOMOPTERA.

Familia Cercopidæ.

Cercopis Strongii. Fig. 12.

Long. lin. 5.

Subaurantius, capite et scutello nigris, elytris ad latera, postice nigro, et aurantio colore variegatis.

Caput nigrum.

Thorax antice rotundatus, postice emarginatus.

Scutellum atrum.

* Read 5th May, 1834.

Elytra antice aurantia, postice nigra, binisque maculis ovalibus flavis ornata.

Pedes atri, tibiis externis apiceque spinosis.

In Coll. Dom. Strong.

Habitat in India Orientali.

Obs.—This beautiful *Cercopis* approaches in form some species from Bengal and China. It is named in honour of — Strong, Esq. F.Z.S, H.S., whose cabinet contains an invaluable collection of resinous insects, the result of forty years' assiduity, and certainly unrivalled.

XI. *Description of* Cucullia Solidaginis, *together with its Larva. By* James Francis Stephens, *Esq., P. E. S., F. L. S., &c.*

Cuc. *Solidaginis.* Plate III. fig. 7.

Alis anticis fusco-cinereis, albido-variis; stigmatibus ordinariis distinctis, margine interiore vittáque ad angulum ani nigris.

Expansio alarum 1 unc. 9—10 lin.

Cuc. *Solidaginis.—Stephens's Illust. Brit. Ent. (Haustellat.) v.* iv. *p.* 390.—No description.

Head and *thorax* greyish-ash or brownish: the *forehead* paler, with darker edges: the *thorax* with an angulated transverse streak, and a large triangular dorsal blotch, deep fuscous: *anterior wings* pale ashy-brown, prettily varied with whitish-ash: the *costa* at its apex marked with alternate deep brown and whitish streaks, placed obliquely: *stigmata* very distinct, with a double blackish margin; between the anterior one and the shoulder is a pale space, terminated close to the stigma by a double waved streak, deepest in colour towards the costa and vanishing towards the inner margin; near the anal angle on the inner margin is a short slightly flexuous hoary streak edged with fuscous, and on the anal angle is a brown patch bearing a short black dash; the hinder margin bears a waved whitish streak, and a faint interrupted black line; on the inner margin is a slender black line: *cilia* pale fuscous, with the base darker: *posterior wings* fuscous, with the base palest, and on the disc a very faint dusky lunule; nervures fuscescent;

cilia pale ochreous, with darker shades, and a dusky line at the base.

Caterpillar (Plate III. fig. 6) long and slender, naked, pale apple-green, with a row of reddish lunules on each side, above the stigmata, and a chain of diamond-shaped reddish blotches down the back: it feeds upon the *Solidago virgaurea*, or golden rod.

This interesting addition to our Fauna was detected in Birch Wood many years since, by the late Mr. J. Standish, sen., and who secured a single example by mothing; but the caterpillar and its food remained unknown until discovered by his son Mr. B. Standish, who found two specimens of the larva in the south-west angle of Birch Wood in September, 1832, which produced the imago in the following June.

XII. *Notice of the Coleopterous Insects observed in the Scilly Islands in July and August*, 1836. *By* Frederick Holme, *Esq.*, *M. A.*, *M. E. S.*

[Read December 5, 1836.]

I collected the following species of *Coleoptera* on the Scilly Islands between July 22 and August 2, 1836: and though I am afraid the list will be found remarkable for little but its deficiencies, I think it as well to lay it before the Society, in the hope of its being subsequently extended, as, I believe, the Islands have been hitherto almost unvisited by entomologists. I must remark that the time and circumstances were not very favourable for collecting, the plant insects being nearly over for the summer, and the small close heath (I believe *Erica vagans*), which forms nearly the sole clothing of the hills, lying so close to the ground as not to admit the introduction of a sweeping-net. The tides too were very high when I arrived, and prevented my having more than two mornings' collecting on the sandy beach at St. Mary's, before it was covered: but for this, I have no doubt that the number of species of *Aleochara*, *Anthicus*, &c. would have been much extended. The species marked with an asterisk I never found in the Land's End district of Cornwall.

Cicindela *campestris*.—In great plenty on Normandy Downs and Salleykey Downs, St. Mary's Island: also on some of the

other islands, but not in the same profusion: I saw one of them fly with a living worm as long as itself in its jaws.

Dromius *foveolus*.—In the sands: but not nearly so common as near Penzance.

Loricera *pilicornis*, Anchomenus *albipes*, and *sordidus*.—All in great plenty: Anchomenus *prasinus* I did not detect, but I found an elytron which seemed to belong to A. *oblongus*.

Agonum *marginatum*.—Found by dozens under every stone round the great Abbey Pond at Tresco (a large piece of water about three feet deep, the only fresh-water pond on the whole group): not found in any other part of the Islands: the specimens varied greatly in tints, from bright copper to light green.

——— *parumpunctatum*.—Not uncommon: the thorax in all the specimens was a much more brilliant green than usual.

Olisthopus *rotundatus*.—Very common: the wings were the merest rudiments possible in every specimen I took on the Islands: from the small size of the specimens, I suspected they might prove *Odontonyx rotundicollis*, but I could detect no denticulations on the claws.

Calathus *melanocephalus*.—Very common in the sand: some were scarce two lines long.

——— *cisteloides*.—Also very common, and varying greatly in size and comparative width: some of my specimens, from their great size and width, I suspect may prove *C. latus* of Stephens's Illustrations.

——— *fuscus* and *mollis*.—Both common on the beach.

Omaseus *anthracinus* and *nigrita*.—I took several specimens agreeing with a pair taken at Penzance some years since, which Mr. Stephens named for me. *O. nigrita* is very common.

Broscus *cephalotes*.—Very abundant in holes in the sand.

Amara *plebeia*, *erythropa*, *communis*, *convexior*, and *atra*.—The species of this genus are so difficult to distinguish by descriptions, that I do not feel sure of having named these correctly; they are all common on the Islands.

Bradytus *apricarius*.—Not uncommon under or-weed on the beach.

Harpalus *latus*.—Found among the sand not uncommonly.

*——— *attenuatus?*—A very pretty insect, not uncommon on the Islands, and particularly abundant on a small uninhabited isle called Teon: generally in company with *Anisodactylus spurcaticornis*. I am not certain that I have been right in identifying it with *H. attenuatus*, Steph.

Harpalus *æneus* and *ruficornis*.—Abundant, as well as the varieties or allied species, *æneopiceus*, *confinis*, &c.

*Anisodactylus *spurcaticornis*.—Common: none agreeing with *A. binotatus*.

Peryphus *tetraspilotus*, Notiophilus *biguttatus*.—Neither common: the *Notiophili* were a variety of a long narrow figure: I sent a pair to Mr. Waterhouse for examination.

Hygrotus *inæqualis* and *affinis?* Laccophilus *interruptus*.—These were the only species I could find round the margin of the Abbey Pond, above-mentioned, but I had not time to examine minutely.

*Cercyon *littorale*, **binotatum*, **dilatatum*, and **deprcssum*, Sphæridium *scarabæoides*, *bipustulatum*, and **lunatum*?—Found in plenty on the beach on fish bones and other animal rejectamenta. The three first are unquestionably only different states of colour and maturity in the same species, as Mr. Stephens suspects. I have a complete connecting series through every shade of colour: they vary greatly in size. *C. depressum* may perhaps be only another variety, though the differences are greater than in the others.

Phosphuga *atrata*.—I took a single specimen, on the wing: I mention this from several eminent entomologists, among whom were Mr. Stephens and Mr. Hope, having told me that they were not aware that the insect possessed the power of using its rudiments of wings for flight: I have several times taken it on the wing in the sunshine.

Simplocaria *semistriata*.—At the roots of sand plants on the beach.

*Hister *maritimus* and **quadristriatus*.—I found two or three specimens of each of these under stones in the loose soft sand in the Island of Sampson, but I had no time to search for more: I thought it singular that I did not find *H. æneus* in the Islands, as it swarms in the Land's End district.

Onthophagus *nuchicornis*, *Dilwynii*.—Not in great numbers: *Dilwynii* most numerous.

Typhæus *vulgaris*.—In great abundance on the Garrison Hill in St. Mary's, and on other parts of the island, but not in such numbers.

Geotrupes *mutator*.—One specimen, I think on Bryer Island.

——— *vernalis*, *sylvaticus*, *niger?*, *puncticollis*, and *stercorarius*.—All common, but the three first, or smooth species, by far the most numerous: *G. stercorarius* the least plentiful of any.

*——— *sublævigatus*.—I took one specimen, which appeared to agree with Mr. Stephens's description of this species: I pos-

sess another specimen which I took on Portland Island in August, 1835.

Aphodius *fossor*, *erraticus*, *fimetarius*, *fœtens*, *scybalarius*, *rufescens*, and *rufipes*.—All in great abundance.

*Ægialia *globosa*.—A few specimens on the sand in Sampson, not noticed elsewhere. I took at the same time and place two specimens of a small insect which I imagined to be a species of *Psammodius*, but they were both devoured by some *Cafii* which were in the same bottle.

Serica *brunnea*.—The season for this insect was over when I was in the Islands, but it appeared to be very common, as I found the remains under almost every stone.

Melolontha *vulgaris*, Amphimalla *solstitialis*, Phyllopertha *horticola*.—The two latter I found in abundance on the Islands, and was informed that the first was equally plentiful in the season.

Cetonia *aurata*.—In great numbers in the governor's garden in the Star Castle, St. Mary's: but very few in other parts of the Islands. Most of the specimens were of a greener tint than usual, having very little coppery gloss: but one which I took with the others was of an uniform deep glossy black, with the usual white markings, and not differing in any respect, except colour, from the common variety. I had taken another exactly similar, nearly on the same spot of ground, during a visit of a few hours to the Islands in the summer of 1833. It is curious that though this species is found in tolerable plenty on the heath about the Land's End, it is never taken near Penzance, or indeed at any distance from the headland.

Ptilinus *pectinicornis*.—Common in the houses.

Leiophlæus *nubilus*, Otiorhynchus *sulcatus*, *rugifrons*, *ovatus*, *pabulinus* and *piccus*, Strophosomus *cognatus*.—All of occasional occurrence in the Islands.

*Apion *hæmatodes*.—Abundant on heath on the Dolphin Downs, Tresco.

Thyamis *tabida*.—Common on prickly plants on the sea sand.

*Macrocnema *marcida*.—This rare species, which is marked as a deficit in Mr. Stephens's catalogue, I found in plenty on the euphorbiæ (I believe) between Blue Carn and Peninnis Head, St. Mary's: but I did not secure many specimens, mistaking them at the time, from the colour, for the immature state of some other species.

——————— *hyoscyami* and *napi*, Phædon *polygoni*, Cryptocephalus *ochraceus*, Coccinella 11-*punctata*.—Passim.

Phylan *gibbus*, Crypticus *quisquilius*.—Both common in the sands:

Opatrum sabulosum, which usually occurs in company with *Phylan gibbus*, I did not detect: neither could I find *Allecula sulphurea*, though it abounds on the same heath near the Land's End.

*Phaleria *cadaverina*.—A single specimen under or-weed on the beach.

Helops *striatus*.—Found under every stone throughout the Islands.

Lagria *hirta*.—Not uncommon.

*Anthicus *humilis*.—Not uncommon among the gravelly sand, and even under the or-weed, on the beach at St. Mary's; but difficult to catch, from its diminutive size and extreme agility. I found it last year on the sands near Ryde.

Polystoma *obscurella*.—The *Aleochara micans* of Stephens's *Illustr.* very common under or-weed, &c. I took one specimen of *Al. Kirbii*, which Stephens has placed as a variety of this species in the second edition of the *Nomenclature*: it appears to differ merely in being twice the size of the common variety, and I have several intermediate specimens.

*Bolitochara *xanthopa*, and **terminalis*.—One specimen of each, under or-weed on the beach: the antennæ in *B. xanthopa* are remarkably long.

——— *assimilis*.—Common in the same locality: the specimens smaller than those about Penzance.

Aleochara *fuscipes*.—Common: I found one specimen in the dry broken carcase of *Typhæus vulgaris*, on the Garrison Hill in St. Mary's.

——— *cursor?*—This species, which is very common in Scilly and on the shores of Mounts' Bay, in dung, under stones, &c. I do not remember ever to have seen elsewhere: it agrees better with the species described by Stephens as *A. cursor*, Kirby, than with any other: but as I do not feel satisfied of their identity, I subjoin a description of my insect.

Length 1—1½ lin. Shining *brassy* black, with very slight pubescence: *thorax* rather widely punctured, with a polished dorsal line, bounded on each side *at the base* by larger punctures running into each other: *elytra* widely punctured, with a short hair in each puncture, and a large triangular fulvous spot, not quite touching the suture, at the inner angles of the apex: *abdomen* rather broad, linear: *antennæ* and *limbs* dull black; hinder knees sub-rufous.

——— *nitida*, *Pella *funesta*.—Found with the last, but much less common.

Tachyporus *hypnorum* and **putridus*.—Passim.

Creophilus *maxillosus*.—This species, which occurs by dozens under every heap of or-weed on the shores of Mounts' Bay, does not appear to be equally common in the Islands: the only locality in which I took it was the beach of the small uninhabited Island of Teon, mentioned above.

*Staphylinus *æneocephalus*.—Very common under stones and in dung throughout the Islands, and more particularly abundant in Bryer. It is worthy of remark that I did not take a single specimen of either *St. æriceps*, or *St. chalcocephalus*, though both abound on the beach in Mounts' Bay, where, on the other hand, I did not find *St. æneocephalus*. These three species appear to me to be very much confounded together in naming collections.

Goërius *olens*, *punctulatus*, and **morio?*—All in tolerable plenty, particularly the two first:—the one I have named *morio?* bears a great resemblance to *punctulatus*, but is much slenderer. Several specimens which I took on Malledgvan, a bare rock to the west of the Islands, had when alive a strong bluish gloss on the elytra, which disappeared after death: they may possibly be referable to *G. cyancus*, but having no specimens for comparison, I cannot determine the point.

Ocypus *similis*, Quedius *tristis*, Philonthus *splendens*, *æratus*, *politus*, *maculicornis*, *sanguinolentus*, and *bimaculatus*.—Passim.

*Philonthus *corruscus*.—This beautiful species was not uncommon under stones about the Abbey Pond in Tresco, in company with *Agonum marginatum* and *Harpalus attenuatus*. I have Mr. Stephens's authority for saying that my insect is his *Ph. corruscus*, but in all my specimens the dorsal punctures on the thorax are only four in each row, instead of five: and the scutellum, suture, and base of the elytra narrowly, are shining brassy black, which is not noticed in his description: the abdomen has a slight golden pubescence. The insect standing in Mr. Curtis's cabinet by this name appeared to me to be specifically distinct, but I had not an opportunity of comparison.

*Raphirus *rufipennis*.—I am not certain whether the specific name be correct, as Mr. Stephens's descriptions in this genus are not so clear as usual.

Cafius *lateralis*, *littoralis*, and *tessellatus*.—The two last are evidently only immature specimens of the first, as Mr. Stephens suspects. They are found in great plenty under or-weed, and are exceedingly voracious, preying on each other when confined together in a bottle.

*Remus *sericcus mihi.*—One specimen on the beach at St. Mary's. *(Vide infra.)*

*Lathrobium *punctatostriatum.*—Under stones near the day-mark, St. Martin's

Lesteva *planipennis.*—Passim.

The insect I have above conditionally named *Remus sericeus*, is one which I have in vain sought for in collections, and which I cannot satisfactorily reduce to any genus described in Mr. Stephens's *Illustrations.* I was told, I forget by whom, that Mr. Rudd had taken an insect resembling it, in Yorkshire. Mr. Stephens, on a cursory view of the specimen one morning at Somerset House, thought it allied to *Othius subiliformis*, but it is at once distinguished from *Othius* by its closely punctate-thorax, which separates it from all the *genera* of Stephens's family *Staphylinidæ*, except *Achenium*, *Lathrobium*, and *Cryptobium*, from the first and last of which its non-geniculated antennæ separate it, as its depressed body, untoothed tibiæ, and conic-acuminate terminal joint of palpi, do from *Lathrobium.* Under these circumstances, I venture, with great diffidence, to propose it as a new genus, to be characterised as follows:—

REMUS.

Antennæ not geniculate; the basal joint longest and stoutest; the two next nearly equal, obconic; the seven next nearly transverse, equal; the terminal longer, acute. *Palpi* with the basal joints nearly equal, obconic; the terminal rather longer, filiform, acuminate at the point. *Head* oblong, ovate. *Eyes* lateral, small. *Thorax* rectangular, elongate, thickly punctate. *Body* depressed. *Abdomen* deeply margined. *Limbs* moderate, without teeth. *Anterior tarsi* moderately dilated.

Remus sericeus.

Length $2\frac{1}{2}$ lines: dull black, with an aureous pubescence on the elytra and abdomen; mouth rufous; antennæ and limbs deep rufous or piceo-rufous, pubescent; head and thorax distinctly and rather deeply punctured, with a smooth spot on the vertex, and another just above the labrum; thorax with a smooth somewhat raised dorsal callus throughout; thorax and head joined by a distinct neck as in *Gyrohypnus;* elytra flat, quadrate, very minutely and closely punctured; abdomen linear, deeply margined, punctured like the elytra.

XIII. *On the Domestic Habits of a Minute Species of Ant.* *By* J. Bostock, *Esq., M. D., F. R. S., &c.*

[Read November 7, 1836.]

The members of the Entomological Society are, I believe, in possession of certain facts respecting the recent appearance, in various parts of the metropolis, of what has been termed the House Ant; and I propose, with their permission, to lay before them a few additional facts on this subject, which have either fallen under my own inspection, or which have been derived from what I consider unexceptionable testimony.

I was informed about two years ago, by Mr. Spence, of the appearance of these animals at Brighton, who stated that they were in such numbers, as to have excited very general attention, and I had received some vague accounts of their having been seen in London, when, in the course of the last spring, I learned that they had made their appearance in my own house. They were found in a cupboard, at the end of the kitchen opposite to the fire-place, where stores were occasionally kept, and also on a range of shelves contiguous to the cupboard. I may observe, that the wall to which these shelves were attached, was sensibly heated by the fire in the contiguous house, and that the animals were the most numerous in that part where the warmth was the most considerable. In the month of June I had the cupboard and shelves removed, and also a dresser connected with them, when in all the parts where any of the wood-work had been let into the walls, or even where it had been in contact with the plaister, the animals were found in prodigious quantities. They were obviously of two very different sizes, one considerably larger than the other, the larger kind constituting perhaps one-sixth part of the whole; there were also a very great number of the larvæ.

The wood-work having been carefully scraped and cleansed, and the cavities of the wall filled up with plaister, the cupboard, &c. were replaced; when shortly after, I was informed, that the animals were observed, in very great quantities, in the floor of the kitchen near the fire-place. The flags which were contiguous to the fire being raised up, the sand below them was absolutely swarming with the animals, and upon examining the boards of the floor, they, as well as the timbers on which they rested, were found to be thickly covered with the animals and their larvæ. Some of the beams appeared to be in a decaying state, and even to exhibit

symptoms of the dry rot, on which account I had the whole of the floor removed, the sand below, to the depth of about a foot, was taken away, and in its place a new floor was laid down, resting upon tiles, which were imbedded in cement.

The grate and the fire-range were then examined, and here the animals appeared to be in still greater quantity than in the former cases; every hole and crevice was absolutely swarming with them. I had all the bricks and mortar carefully removed, every part of the iron-work cleaned, and the whole of the range set up with fresh bricks and tiles, and even the inside of the chimney, to the height of six or seven feet, lined with fire-tiles, imbedded in cement. The effect of all these operations has been to reduce the number of the animals very considerably, but still there are many of them creeping about the fire-place, and especially in the breast of the chimney. The other parts of the kitchen are altogether, or, at least, very nearly free from them, a single straggler alone having been occasionally seen on the end of the dresser, or on the skirting-board near the stove.

This occurrence in my own house has naturally led me to make many inquiries about the existence of these animals in other places, and the result has been to prove, that, within the last year or two, they have appeared in a great many parts of the metropolis, considerably distant from each other. I have, however, found great difficulty in obtaining accurate information on this subject. This arises from two causes; first, from the information being necessarily obtained principally from the servants of the families, the animals almost invariably making their appearance, in the first instance, in the kitchens of the respective houses; and, more particularly, from the unwillingness which many persons manifest to have it known that their houses are infested with the ants. I think, however, that I have obtained sufficient proof that they extend over a district commencing at Gray's Inn Lane in the east, extending at least as far as the line of Regent Street in the west, and in the other direction, from the commencement of Somer's Town to the Strand. I also know that they are in a house at Hampstead, and I have heard that they have made their appearance in Southwark. I have ascertained that they have invaded several shops, principally bakers' and grocers', and that, in some cases, they have been found so serious a nuisance, as to cause the occupier to leave the premises.

I have made many inquiries respecting the mode in which they have been supposed to have entered the houses, but I regret to say, that I have obtained but little precise information. In some

cases it appears probable, that they have proceeded from one house to another through crevices in the party-walls, and in others, that they have been conveyed by articles that have been sent into the houses from the shops. In one case it was clearly ascertained, that they were introduced from the grocer's in a parcel of raisins.

No method, as far as I can learn, has yet been discovered of destroying them or banishing them from a house of which they have got possession. The most powerful chemical acids appear to have little effect upon them; I have myself tried the vapours of ammonia and of chlorine. They are, indeed, destroyed by being immersed in boiling water, but this, it is obvious, cannot be employed in many situations where they are found. We have adopted a plan which has appeared to diminish their numbers in a very sensible degree, and which may be adopted until a more effectual one be discovered. A slice of meat is placed on the hearth of the kitchen, which, in a short time becomes covered with them; it is then dipped into a vessel of boiling water, by which they are detached from it and destroyed; the meat is then replaced and the operation repeated. In this way we must, at one time, have destroyed many thousands daily, and it seemed to have the further good effect of preventing them from straying to other parts of the house.

I shall not occupy the time of the Society in detailing to them the various reports that I have heard about these animals, because I believe that many of these reports are without foundation, and certainly without sufficient proof. I think it better simply to lay before the Society the facts only on which I can depend; by which means I may hope to draw the attention of its members to a subject which really appears to me of very great public interest. In conclusion, I may add, that I shall be most happy to co-operate with the Society in any plan of investigation or experiment which they may suggest, as, I apprehend, it can only be by observing their habits and becoming acquainted with every thing connected with their history, that we can hope to discover any mode of checking their progress.*

* Some additional observations and suggestions relative to this subject, by various members of the Society, will be found in the Journal of Proceedings.

XIV. *Descriptions of New Exotic* Aculeate Hymenoptera. *By* W. E. Shuckard, *V. P. E. S., Librarian to the Royal Society.*

[Read 4th January, 1836.]

(Plate VIII.)

I beg leave to occupy the attention of the Society a few minutes with descriptions of some new genera and species of *Exotic Aculeate Hymenoptera*. The Society is indebted to my friend Mr. F. Smith for the accompanying accurately executed plate.

Family. MUTILLIDÆ.

Genus. Psamatha,* *Shuck.* Plate VIII. fig. 1.

Head transverse, depressed; *stemmata* placed in a curve on the vertex. *Eyes* lateral, distant and oval. *Antennæ* inserted at the base of the clypeus, nearly as long as the scutellum, thirteen-jointed, the joints very distinct, with the scape the thickest, the second the smallest, and the third the next shortest, the remainder subequal, and the entire antenna subfusiform; the *clypeus* carinated longitudinally in the centre, subemarginate in front, and laterally slightly produced and projecting, giving it the appearance of being subbilobate (approximating to that of *Cerceris*); *labrum* concealed; *mandibles* strong, tridentate with the *teeth* subequal, the external one the largest.

The *prothorax* forming a slight convex curve extending between the tegulæ of the wings; the *mesothorax* with two longitudinal furrows and a central elevation which extend from its centre to the suture of the scutellum; the *scutellum* quadrate; and the *metathorax* on a gradually inclined plane. The *superior wings* with one marginal and four submarginal cells; the fourth apical and the second receiving the two recurrent nervures just beyond its centre. *Legs* moderate, slender; *posterior tarsi* elongate, and all the terminal claws minute.

Abdomen lanceolate; the first segment forming a petiole, and not so wide as the second, and the seventh last segment has on each side two valves projecting beyond it, each forming the quadrant of a circle, and externally fringed; the *hypopygium* quadrate. From a male.

* Ψάμαθος, *sabulum.*

Obs.—This genus, which has precisely the habit of a male *Mellinus*, is remarkable as being the only one yet characterized among the *Mutillidæ*, in which the second submarginal cell receives both the recurrent nervures, as also in its clypeus, which approaches to the structure of that of *Cerceris*. I have named it in allusion to its presumed habits of frequenting sandy situations; it may subsequently prove to be the male of Mr. Westwood's genus *Diamma*,* in which case it must necessarily fall; but as there is so great a discrepancy between them, I judge only from analogy, and have, therefore, thought it desirable to characterise it until future observations shall corroborate, or remove, my suspicion.

A similar kind of circumstantial evidence induces me to consider that the genus *Thynnus*† will eventually prove to be the males of the genus *Myrmecodes;* but I have no doubt that the first box of insects sent by Mr. Lewis, or his next letter, will determine if I am correct. Acting upon this view, I have removed *Thynnus* from the *Scoliadæ*, where it was placed by Latreille, amongst which he would have also located the present genus. Insects with apterous females (as I presume this to be) are difficult to determine until positive observations are made by duly qualified collectors.

Species 1. Psamatha chalybea, *Shuck.* Plate VIII. fig. 1.

Chalybea, nitida, griseo-pubescens; margine postero prothoracis albido; abdomine utrinque maculis quatuor albidis; pedibus rufis et tarsis piceis. ♂.

Length 6 lines. Expansion of the wings $11\frac{1}{4}$ lines.

Chalybeous, shining, loosely covered with grey hair; the antennæ black; the lower half of the internal orbit of the eyes, a short line on their exterior at the vertex, the lateral productions of the clypeus, and the internal margin of the mandibles at the base, all white; the cheeks covered with long hair, as well as the thorax, which is slightly punctured; the prothorax with a narrow white line at its posterior margin, interrupted very slightly in the centre; the wings subhyaline, their nervures black; the legs red, with the coxæ and

* Proceedings of Zoological Society, April 14, 1835.

† This, I have since discovered, has been stated by Klug, in a paper on the Eyes of Insects, in the Transactions[1] of the Academy of Berlin, and, I presume, from the observation of a correspondent in New Holland. My own supposition proceeded from analogy. Mr. Lewis has since confirmed this by having detected the *Thynnus variabilis*, Leach, *in copulâ* with an apterous female congeneric with the *Tiphia* (*Myrmecodes*, Latr.) *pedestris*, Fab.

[1] *Abhand. der Akademie der Wissenschaften*, für 1831, p. 307.

trochanters chalybeous, and the extreme apex of the tibiæ and entire tarsi piceous; the tibiæ very slightly externally spinose.

The abdomen with a minute white spot on each side of the first segment at its apex, and a widely interrupted band on the three following, which is continued, yet slightly interrupted in the centre, at the margin of the ventral plates; the lateral valves of the seventh segment also white and externally ciliated. ♂.

From the neighbourhood of Sydney, New South Wales.

In my own Collection, and in that of the Entomological Society, formerly Mr. Kirby's.

Family. POMPILIDÆ.

Genus. Ceropales, *Latr.*

Species 1. Cerop. picta, *Shuck.*

Nigra; ore, antennis, scutello, prothorace, metathorace, pedibusque rufis; abdomine fasciis quinque albidis. ♀.

Length 3½ lines. Expansion of the wings 6 lines.

Black; the orbit of the eyes, with the exception of a small space interrupted at the vertex, and the lateral basal angles of the clypeus, white. The antennæ, remainder of the clypeus, labrum, and mandibles, red. The thorax has the prothorax, scutellum, tegulæ, and metathorax, red; a white line beneath the scutellum, and the wings hyaline, with their extreme apex dark. The legs red.

The abdomen black, with a red band, followed by a white one just beyond the centre of the first segment, and the margins of the third, fourth, and fifth, and apex of the sixth, white. ♀.

From the Cape of Good Hope.

In my own Collection.

Obs.—This is gayest insect I know amongst its congeners.

Species 2. Cerop. anomalipes, *Shuck.*

Nigra; aureo-pubescens; abdomine pedibusque rufo-testaceis; femoribus tibiisque quatuor anterioribus brevibus, crassis, compressiusculis; pedibus duobus posterioribus gracilibus. ♂.

Length 5½ lines. Expansion of the wings 11½ lines.

Black; the first and second joints of the antennæ beneath, the entire face beneath their insertion, the clypeus and the mandibles, with the exception of their extreme apex, white, as well as a central minute spot beyond the base of the antennæ, and the internal orbits of the eyes halfway up; a depression in the face on each side just beneath the vertex, forming a slight cavity for the reception of the scape of the antennæ; the stemmata placed high, near

the occiput, in a triangle; the whole face, pleuræ, and sides of the metathorax, covered with a close golden down.

The posterior margin of the prothorax, a spot at its lower angle in front, just above the coxæ of the anterior legs, and a small mark beneath the scutellum, white. The tegulæ piceous; the wings hyaline, with their nervures black. The legs rufo-testaceous, with the anterior and intermediate coxæ yellow, and the apex of the posterior tibiæ, and their tarsi entirely, piceous. The anterior and intermediate femora and tibiæ short, incrassate, compressed, their tarsi not longer than their tibiæ; the posterior pair of legs very long and slender, being nearly twice the length of the whole body, and their tarsi twice the length of the tibiæ. The abdomen rufo-testaceous, immaculate. ♂.

From the Brazils?

In my own Collection.

Obs.—The extraordinary disparity in the legs of this insect makes it especially remarkable. I am not quite sure that it is from the Brazils, but I purchased it from a dealer with other undoubted Brazilian insects. The immaculate abdomen also is singular, as in its congeners it is generally spotted or banded.

Genus. Exeirus,* *Shuck.* Plate VIII. fig. 2.

Head small, subglobose. *Antennæ* filiform, with twelve joints in the ♀, and thirteen in the ♂; the scape short, robust; the pedicle very small, nearly concealed within the scape, the third joint the longest, the rest gradually decreasing in length, subcylindrical, inserted in the centre of the face above the clypeus. The *stemmata* placed in a close triangle, rather below the vertex. *Eyes* inclining forwards, not strictly lateral. *Clypeus* transverse, projecting, slightly emarginate in front. *Labrum* longitudinal, subquadrate, the anterior angles rounded. *Mandibles* large, robust, slightly arcuate, subquadridentate; the external and the third tooth the largest, the external one obtuse.

Thorax gibbous. *Prothorax* transverse, very slightly curving laterally. *Scutellum* scarcely distinct, a triangular space enclosed by furrows at the base of the metathorax. The *wings* with one elongate marginal and four submarginal cells, the fourth apical, and the second petiolated, receiving the first recurrent nervure near its centre, and the second towards its extremity; the third cell very much curved. The *legs* long, robust; the *tibiæ* strongly spinose, ♀ and the anterior *tarsi* ciliated ♀, simple in the ♂; the *terminal claws* very large.

* Ἐξειρω, *exsero.*

The *abdomen* ovato-conical, attached by a short petiole to the thorax, and acuminate at its apex ♀, obtuse ♂.

Obs.—This genus is scarcely in its place amongst the *Pompilidæ*, but seems osculant between it and the *Sphegidæ;* yet it may possibly constitute a new family with another insect that I possess, intermediate between the two, and partaking of the characters of both. I have named it in allusion to the extension of its legs.

Species 1. Exeirus lateritius, *Shuck.* Plate VIII. fig. 2.

Niger, pubescens; capite, antennis, tibiis, tarsis, abdomineque (basi excepto) lateritiis. ♂, ♀.

Length 12 lines. Expansion of the wings 22 lines.

Black; the head of a yellow-red, excepting a small spot enclosing the stemmata, and extending to the occiput; the apex of the mandibles piceous; the clypeus, face, and cheeks covered with a dense silvery down.

The thorax very pubescent; the tegulæ testaceous; the wings testaceous, their nervures fuscous. The anterior legs entirely, excepting the coxæ, and the knees, tibiæ, and tarsi of the remainder, lateritious or of a yellow red; of which colour is also the abdomen, excepting the basal joint, the extreme base of the second and third joints, and the venter. ♂, ♀.

From Sydney, New South Wales, and Van Diemen's Land.

In my own Collection, and that of the Entomological Club.

Family. NYSSONIDÆ, *Leach.*

Genus. Astata, *Lat.*

Species 1. Astata Australasiæ, *Shuck.*

Atra, nitida; abdomine rufo. ♀.

Length 4½ lines.

Head and thorax black and shining; antennæ piceous, the scape alone black; metathorax reticulated, tegulæ testaceous, wings dark at the base, fuscous towards the apex, nervures testaceous, legs black; tibiæ and tarsi rufo-piceous, the tibiæ very spinose.

Abdomen entirely rufo-testaceous; the margins of the segments very slightly depressed. ♀

From New Holland.

In my own Collection.

Obs.—I have described this insect, which is unique as Australasian in my Collection, to show its wide geographical range. I know no other extra-European species of the genus, excepting those figured in Savigny's *Egypt.*

Genus. Pison. *Jurine, Spinola, Latr. &c.*
[*Tachybulus*, Lat., *Nephridia*, Brullé.]

As some doubt and confusion still exists respecting this genus, it will perhaps be as well to state its history. The type was first discovered in 1805, by Spinola, near Genoa; he took three specimens, one of which he sent to Latreille, the second to Jurine, and the third he retained, and which he described, in the fourth fasciculus of his *Insecta Liguriæ*, as *Alyson ater*. Latreille wrote him word in 1807, that he had found the same insect, and thought it to be the *Myrmosa atra*, but if not, it was a new genus in the vicinity of *Trypoxylon*. In 1808, Jurine replied to Spinola, by sending him the generic character of the insect in question, which he called Pison, and considered it as allied to *Alyson*. Latreille forgetting this, for I presume he had Spinola's book as soon as published, which was in 1808, gave in the fourth volume of his "*Genera*," published in 1809, at page 57, the characters of the genus *Dolichurus*, under the name of *Pison*, which he refers to Spinola as the author, and under the name of *Tachybulus*, he gives the characters of the true genus *Pison*. The first error he corrects in the Addenda to the same volume; and the second error he continues in the same place, by making Jurine's *Pison* the synonyme of his *Tachybulus*. It is needless to follow him through his several works; as in the 5th volume of Cuvier's *Règne Animal*, 2d ed. he corrects his original error, but still refers the genus to Spinola, for he expressly says, "Jurine is not the author of the genus *Pison*." In vol. 2, p. 403, of the *Annales de la Société Entomologique de France*, M. Brullé has laid down the characters of a genus of *Fossorial Hymenoptera*, which he calls *Nephridia*, and which is identical with *Pison*. I have consequently been obliged to reduce his genus to a synonyme of the old one, and I will beg to make an observation or two upon his remarks. I shall say nothing upon his waste of words respecting its being parasitic, from the structure of its legs, which I have elsewhere* shown, in controverting St. Fargeau's theory, to be wholly untenable, and into which opinion its first propounder appears to give, by not saying a word about it, nor making the least use of it when it would have afforded him such abundant materials in his subdivision of the genus *Crabro*. But it was unnecessary of M. Brullé to recapitulate all this, as St. Fargeau had already given the entire theory in the first number of the same work. It was also unnecessary for him to go into his detailed comparison with the genus *Alyson*, as the first

* *Transactions of the Entomological Society of London*, vol. i. p. 52, and *Essay on the Indigenous Fossorial Hymenoptera*, p. 19, 210, &c.

glimpse tells us that it is more closely allied to *Tachytes*, Pz. (*Lyrops*, Ill.) than to any other fossorial insect, view being had to general habit rather than to any single character; nor does it agree with *Alyson* in more than a single character. Reniform eyes, which *Alyson* has not, and which is one of the chief characters of the present genus, we find straggling through several families of the *Aculeate Hymenoptera*. Amongst the *Mutillidæ* we discover it in many males of *Mutilla*, and slightly so in *Myzine*, but always in *Scolia*, *Sapyga*, *Polochrum*, and *Trypoxylon*, and slightly in *Philanthus*, when we at last observe it as almost universal in the *Vespadæ*, wherein the instances in which it is not so form rare and remarkable exceptions, and one of which the present paper will describe. The only character in which *Pison* agrees with *Alyson* is the petiolated second submarginal cell, which we also find in the just-described genus *Exeirus*, amongst the *Pompilidæ*, and in *Miscophus*, *Nysson* and *Cerceris*. His subsequent observations on the families are of but little value, as they point out no new affinities; and the only generic character he has really added is the single calcar of the intermediate legs, to which I may supply, as generic also, the longitudinal furrow of the metathorax with its central carina. I consider myself right in treating this as generic, as it occurs in all the species, but in the *Pison Spinolæ* it is rather less developed. That the metathorax frequently yields generic characters in these insects, we find in the mucro of *Oxybelus*, the spines of *Nysson* and *Alyson*, the triangle of *Gorytes*, and the carinæ and obtuse spines of *Ampulex*. I may, therefore, be justified in treating it as such. The segments of the abdomen are not constricted as in *Cerceris*, but the margin of the first three are much depressed, which gives them slightly this appearance, aided, too, by the sometimes considerable gibbosity of the first segment. There is great specific diversity in the form and size of the second submarginal petiolated cell, as well as in the mode of its receiving the recurrent nervures, which are sometimes interstitial, inosculating with the transverse cubital nervures, and sometimes received within it; and in other instances which, in accordance with my adopted principles, I must consider as subgeneric,—the first submarginal cell receives the first recurrent nervure towards its extremity, and the second receives the second recurrent about its centre. I am enabled here to add seven new species to those already described. The genus appears to be widely distributed, as there is one European and four African, including that from St. Helena, one from the Mauritius, and three from the Australian group, where it appears to take the place of *Tachytes*, Pz. (*Lyrops*, Ill.)

Division 1. (Pison, *Jurine, &c.*)

The recurrent nervures either interstitial or both received by the second submarginal cell.

Species 1. Pison ater, *Spin.*

Ater, subpubescens, vagè punctatus; alis hyalinis, apice obscuris, nervis nigris.

Long. 4 lin.

Alyson ater. Spin. Insect. Lig. fasc. 4, p. 253.

Pison Jurini. Ib. 256; St. Fargeau et Serville, Ency. Méth. x. 143, 1.

Tachybulus niger. Latr. Gen. Crust. et Insect. vol. iv. p. 75.

Pison ater. Latr. ib. 387.

Obs.—I have been obliged to construct the best specific diagnostic that I could contrive for this species, as I do not possess it, nor do I know any cabinet in London in which it is to be found Spinola's, Latreille's and St. Fargeau's descriptions contain no character beyond colour, which is not common to all the species, and consequently generic.

Species 2. Pison xanthopus, *Brullé.*

Niger; thorace tenuissimè punctato, metathorace obliquè striato; capite anterius aureo-villoso; mandibulis, palpis, tarsisque saturatè, abdominis apice obscurè, rufis; segmentis 3 primis margine argenteo-pilosis; alis hyalinis, apice nervisque fuscis.

Long. 4 lin.

Nephridia xanthopus. Brullé, Annales de la Soc. Ent. de France, vol. ii. p. 403.

Species 3. Pison obscurus, *Shuck.*

Niger, tenuissimè punctatus; metathorace obliquè striato; alis fuscis, nervis tegulisque testaceis. ♂, ♀.

Length 4—5½ lines.

Entirely black, delicately punctured; the apex of the antennæ and mandibles rufo-piceous; the face and clypeus covered with a golden down, which extends as high as the emargination of the eyes. The tegulæ of the wings testaceous, the wings fuscous, their nervures testaceous; the extreme joints only of the tarsi piceous, and the tibiæ and tarsi without spines or ciliæ.

The abdomen has the margins of the first, second, and third segments much depressed and covered with a dense silvery down. ♀.

The ♂ differs in having more joints of the tarsi rufo-piceous, as well as the knees and the margin of the fourth, fifth, and sixth seg-

ments of the abdomen, and the terminal one entirely so; the latter obtuse at its extremity.

From the Cape of Good Hope?

In my own Collection.

Obs.—The above *Pis. xanthopus* may, perhaps, be a variety of this insect, in which case my name must fall, and Brullé's be retained, although mine will be the species, and his the variety, as piceous, red, and even testaceous, are frequently the immature stages of black. The difference in the colour of the wings and nervures may also be accidental, as his is probably an insect in fine condition, and mine are evidently old individuals; and it is a fact long known, that the dark colour of wings, by exposure and wear, will become pale at the apex, and hyaline wings will frequently become fuscous. If, therefore, my suspicion be correct, which is founded entirely upon my male, the wings of his and the body of mine would constitute the true species. The several differences have induced me to describe mine as distinct, yet that of size is of no moment, as all these insects vary greatly in that particular. I am doubtful of its exact locality, but I believe it to be from the Cape.

Species 4. Pison Spinolæ, *Shuck.*

Niger, cinereo-pubescens; alis schistaceis, cellulâ secundâ submarginale minutissimâ; metathorace obliquè striato. ♀.

Length 7½ lines.

Black; the forehead, cheeks, entire thorax and base of the abdomen, covered loosely with long grey hair. The emargination of the eyes, clypeus, cheeks, covered with silvery down. The mandibles bearded externally towards the base, and longitudinally carinated, the carina being formed by two furrows, their internal tooth placed at about one half their length, and very obsolete. Labrum transverse, slightly emarginate, and ciliated anteriorly.

The carina of the central longitudinal furrow of the metathorax nearly obsolete, and the metathorax itself on each side irregularly and obliquely striated, the striæ diverging from the base. The wings clouded-slaty, their extreme apex dark, and the nervures black; the petiolated submarginal cell very minute, and receiving the two recurrent nervures at the inosculating points of its transverse cubitals. The tibiæ and tarsi simple.

The margins of the first, second, and third segments of the abdomen depressed, and with its sides and the extreme edges of their margins reflecting an obscure silvery hue. ♀.

From Sydney, New South Wales.

In my own Collection, and in that of the Rev. F. W. Hope.

Obs.—This conspicuous species, the largest yet discovered, I dedicate with much pleasure to the Marquis of Spinola, the first discoverer of the genus. It differs slightly from the type in its mandibles and metathoracic sculpture.

Species 5. Pison punctifrons, *Shuck.*

Niger, cinereo-pubescens; fronte et thorace anteriore densè et crassè punctato; alis hyalinis, margine obscuriore. ♀.

Length 5½ lines.

Entirely black; the head, thorax, pectus, legs, and base of the abdomen, loosely covered with long grey hair; the face beneath the antennæ, the cheeks, and the sides of the abdominal segments, with a silvery reflection; the face above the antennæ very thickly and coarsely punctured, but which diminishes in coarseness above the anterior stigma.

The thorax in front and beneath also coarsely and thickly punctured, its disk and scutellum equally coarsely but less thickly so, and slightly shining; the metathorax very coarsely obliquely striated, but which is somewhat concealed by the hairs covering it; the wings hyaline, with their margins obscure and nervures black, the recurrent nervures inosculating with the transverso-cubitals; the legs and tarsi without ciliæ and lateral spines.

The abdomen shining and reflecting, laterally only, a silvery hue. ♀.

Either from India or St. Helena.

In the Cabinet of Mr. Westwood.

Obs.—This species at first sight much resembles the *P. Spinolæ*, but, upon examination, it is at once distinguished by its very coarse sculpture, and the size of its second submarginal cell.

Species 6. Pison Westwoodii, *Shuck.*

Ater, glaber, tenuissimè punctatus; capite anterius argenteo-villoso, alis hyalinis, margines versus leviter nebulosis; metathorace obliquè striato, carinâ obsoletâ. ♀.

Length 3½ lines.

Entirely atrous; the head and thorax very delicately punctured, the lower part of the face and clypeus covered with a silvery down. The metathorax obliquely striated, and the carina of the central channel obsolete. The wings hyaline at the base, and clouded towards their apex; their nervures black; the first and second recurrent nervures received distinctly within the second submarginal cell. The tibiæ and tarsi simple.

The abdomen deeply atrous and slightly shining, but without any silvery reflection. ♀.

From Van Diemen's Land.

In the Collection of Mr. Westwood.

Obs.—This species is distinguished from all its black congeners by the way in which its recurrent nervures are received in the second submarginal cell; it is also remarkable for its intensely atrous hue, without any of the silvery reflection which is seen in them. I am not sure that this is peculiar to it, for it may have arisen from immersion in spirits of wine, which the specimen has much the appearance of having undergone. I have much pleasure in dedicating it to my friend Mr. Westwood, whose highly interesting Collection has furnished me with the means of describing several new species in this much-neglected genus.

Species 4. Pison auratus, *Shuck.*

Niger, subtiliter punctatus, aureo-pubescens; segmento primo et ultimo abdominis marginibus reliquis et pedibus rufo-testaceis. ♀.

Length 6 lines.

Black; delicately punctured; entirely covered with a dense golden pubescence, which is thickest upon the face and clypeus, the cheeks, collar, sides of the mesosternum and metathorax and the depressed margins and sides of the segments of the abdomen. The first five joints of the antennæ and the mandibles, except their apex, rufo-testaceous, as well as the legs, the calcaria and apical pulvilli of which are black; the tarsi and tibiæ all simple. The metathorax laterally delicately punctured, the central carina very conspicuous: the petiolated second submarginal cell rather large, and distinctly receiving the recurrent nervures within it, although close to the transverso-cubitals. The tegulæ testaceous; the wings clouded, their nervures piceous.

The abdomen rufo-testaceous, with the base of the intermediate segments black. ♀.

From the Cape of Good Hope?

In my own Collection.

Obs.—This is a very beautiful insect; the size of the petiolated cell is a little larger than in its congeners. Its sculpture is apparent only where its pubescence is rubbed off, and I expect that, in fine condition, it is wholly covered with the golden down. I am doubtful of its true locality, but I think it is from the Cape.

Division 2. (Pisonitus, *Shuck.*)

The first recurrent nervure received towards the apex of the first submarginal cell, and the second recurrent received about the middle of the second submarginal cell.

Obs.—In adhering strictly to the neuration of the wings as a distinctive character for generic subdivision in the Aculeate Hymenoptera, it would be proper to consider this as a genus, but I am less inclined to adopt it as such here, from the circumstance that all the preceding species vary in the mode of receiving the recurrent nervures, and in the size of the second submarginal cell, and also because there is no other character to support this generic separation. In adopting this same principle in my "*Fossorial Hymenoptera*," upon separating *Mimesa* from *Psen*, and *Celia** from *Stigmus*, my views have been supported by general habit, but here it is not so.

Species 8. Pison rufipes, *Shuck.*

Niger; mandibulis basi, palpis pedibusque rufis; tegulis testaceis; metathorace obliquè striato ♀.

Length $3\frac{1}{4}$ lines.

Black; delicately punctured; the face beneath the antennæ, the clypeus, the cheeks, the collar, and sides of the segments of the abdomen, all covered with a silvery down. The mandibles and palpi rufescent.

The metathorax obliquely striated; the central carina distinct; the tegulæ testaceous; the wings slightly clouded with fuscous, their nervures black. The legs red, with the exception of the anterior pair of coxæ, trochanters, and femora, and the base of the posterior coxæ; the tibiæ and tarsi simple.

The abdomen somewhat less shining than in its congeners. ♀.

From Van Diemen's Land.

In the Collection of Mr. Westwood, and in my own.

Species 9. Pison argentatus, *Shuck.*

Ater, argenteo-pubescens; metathorace obliquè striato, striis distantibus, interstitiis punctatis; alis hyalinis, tegulis testaceis. ♀.

Length 3 lines.

* This name I have discovered since my book was printed is pre-occupied, Zimmerman having used it to designate a genus of the *Harpalidæ* in his monograph of the *Zabroïdes:* but this would have been of no consequence whilst it was merely a name; but he has since characterized the genus in a paper on the *Amaroïdes* in the "*Faunus*" of Gistl. It is, therefore, necessary to change my name, and I propose in lieu *Spilomena*, from σπιλωμα, *nævus*, the synonyme of κηλις.

Atrous; densely clothed with a silvery pubescence, especially the face, cheeks, collar, sides of the thorax, sternum, metathorax, and legs, and the sides and margins of the segments of the abdomen. The metathorax with the central carina distinct, laterally obliquely striated; the striæ far apart, and the interstices punctured. The tegulæ testaceous. The wings hyaline, their apex somewhat obscure, and the nervures black; the legs unarmed. The abdomen having the constrictions of the three first segments very conspicuous. ♀.

From the Mauritius.

In the Collection of Mr. Westwood.

Obs.—The chief character of this elegant little insect, namely, its silvery clothing, is evanescent, as it would exhibit this only in a fine condition; but the sculpture of its metathorax, combined with the peculiar neuration of its wings, afford sufficient positive characters to separate it from its yet known congeners. It is unique in Mr. Westwood's Collection. This genus, as I have above remarked, appears very widely distributed, even more so than *Tachytes*, the metropolis of which is either Africa or India, whereas, most probably, that of the genus before us is New Holland and its dependant islands.

Family. CRABRONIDÆ, *Leach.*

Genus. Gorytes, *Lat.*

(*Hoplisus*, St. Farg.)

Gorytes Brasiliensis, *Shuck.*

Ater, nitidus; abdomine fasciis tribus flavis. ♂.

Length $5\frac{1}{4}$ lines.

Entirely black and shining; the antennæ slightly increasing towards the apex, and a little longer than the head; the scape, beneath at its apex having a minute yellow dot; labrum piceous, ciliated externally; the mandibles rufo-piceous in the middle.

The thorax having the collar on each side marked with a short and slight sericeous line: the metathorax very gibbous; the triangle at its base with a central furrow produced by two longitudinal carinæ, and laterally and posteriorly rufous. The wings dark at the base as far as the commencement of the marginal and second submarginal cells, beyond which they are hyaline; the nervures black; the tibiæ and tarsi shining and spinose, the anterior pair of the latter strongly ciliated.

The abdomen with the first segment prolonged anteriorly into a petiole; the margins of the second, third, and fourth segments with

a very narrow yellow border; the margin of the sixth segment testaceous. ♂.

From the Brazils.

In my own Collection.

Obs.—I believe this to be the first instance of this genus recorded as Brazilian.

Family. VESPIDÆ, *Leach.*

Genus. PARAGIA,* *Shuck.* Plate VIII. fig. 3.

HEAD transverse, stemmata placed in a triangle on the vertex; *eyes* oval, lateral, distant; *antennæ* geniculated, inserted above the clypeus near the middle of the face, and at equal distances between the eyes; *clypeus* slightly convex; *labrum* concealed; *mandibles* robust, tridentate, the external tooth the largest.

THORAX nearly square; the *prothorax* making a wide curve backwards to the tegulæ, its anterior angles acute; the *tegulæ* placed about the middle of the thorax; an impression of the shape of a lyre upon the mesothorax, with another longitudinal and central; *scutellum* subquadrate, very prominent; *metathorax* abruptly truncated; *anterior wings* with one marginal cell, and two submarginal cells, the first of the latter very long and narrowing towards the second, which is nearly oval, and receives both the recurrent nervures; the *legs* short, and somewhat robust; all the *tarsi* longer than the *tibiæ,* the anterior pair furnished beneath with pulvilli; the terminal *claws* minute, and the apex of all the tibiæ furnished with a pair of small calcaria.

ABDOMEN elliptical, abruptly truncated at its base.

Obs.—This genus I have named in allusion to its deceptive habit, which is precisely that of a *Vespa;* but, upon closer inspection, its distinctive characters are exhibited, which are very remarkable, and form another exception to the general characteristic of the family, even if *Ceramius* be removed from it, which I think ought to be. The distinctions are its *ovate,* not reniform eyes, and its two submarginal cells. In this latter character it however participates with the *Masaridæ.* The structure of its mandibles and anterior tarsi induce me to consider it as social, and it is possibly the New Holland analogue of the genus *Vespa,* which I have not yet discovered to come from that place; but even, if so, it must be of unfrequent occurrence, as mine is the only specimen I have hitherto

* From Παραγω, *fallo.*

seen. I do not remember if it folds its wings, as when it came into my possession I was too young an Entomologist to know the value of that character, to observe it before I set the insect.

Species 1. Parag. decipiens, *Shuck.* Pl. VIII. fig. 3.

Niger, opacus, abdomine sordidè ochraceo. ♀.

Length 9 lines. Expansion of the wings 14 lines.

Black, opaque ; with the head and thorax delicately shagreened ; two minute yellow spots between the base of the antennæ. A narrow yellow line on each side of the anterior edge of the prothorax, and another spot of the same colour beneath the base of the wings, which are subhyaline, with a dark cloud covering their marginal, submarginal, and discoïdal cells, and their nervures black ; the legs black, and, the posterior ones especially, covered externally and internally with a close silky down, which gives them the appearance of having a white streak.

The abdomen of a dirty ochre yellow, which was probably originally of a bright tint ; the extreme base of the first segment black, which descends in the centre to its margin. ♀.

From New South Wales.

In my own Collection.

Obs.—If my suspicions be correct as to the social habits of this insect, it is probably a neuter.

XV. *Descriptions of two Species of the Coleopterous Family* Paussidæ. *By* W. W. Saunders, *Esq., F.L.S., &c.*

[Read December 7, 1835.]

Paussus Fichtelii, Donovan.

Plate IX. fig. 1.

Castaneous.—*Antennæ* nearly as long as the head and thorax, with the terminal joint large, somewhat quadrangular, excavated on the exterior side, the outline waved, and a sharp pointed production on the external basal angle. *Head* as broad as the thorax, hirsute, nearly orbicular, with a deep longitudinal excavation between the eyes, extending from the base of the antennæ to half the length of the head. *Thorax* hirsute, quadrate, with a deep transverse wavy excavation across the middle, and a longitudinal impression down the centre posterior part, and underneath black. *Elytra* hirsute, quadrangular, twice the breadth of the thorax, and nearly twice as long as broad; black, with the base, apex, and a narrow marginal band, castaneous. *Abdomen* projecting considerably beyond the elytra. *Legs* moderate, slender, with the base of the femora black.

Length one-fourth of an inch.

Obs.—This rare insect, of which only two or three specimens exist in this country, was sent to me from Calcutta, where it was collected by my friend F. Bellairs, Esq., to whom I am also much indebted for many other valuable additions to my collection. Although the species is already known, I have thought that a good figure and description from a fresh specimen might still be interesting.

Fig. 1 *a*. Head and front of thorax in profile. 1 *b*. Abdomen beneath.

P. S.—The vertical impression on the head incloses two minute elevated tubercles; the legs are comparatively very slender, the tarsi long and simple and distinctly five-jointed; the lateral lobes of the mentum long and acute; the elytra furnished at the posterior external angles with a small tubercle, as in several other species of the genus; the two masses at the extremity of the abdomen having the appearance of a deeply emarginate joint, are formed only of a very thick brush of hairs, and the under side of the abdomen is five-jointed; the second and third joints being very short, the fourth simple, and the fifth short. J. O. W.

Platyrhopalus Westwoodii, mihi. Plate X. fig. 5.

Castaneous.—*Antennæ* about two-thirds the length of the head and thorax, the terminal joint very large, nearly lenticular, slightly hirsute, with a pointed production at the base exteriorly. *Head* somewhat orbicular, nearly as broad as the thorax, darker posteriorly, the eyes projecting. *Thorax* cordate, slightly hirsute, with three transverse impressed lines across the base, dark-castaneous, the anterior angles lighter. *Elytra* twice the breadth of the base of the thorax, half as long again as broad, slightly hirsute, with a large triangular black spot on each elytron at the base; another large somewhat semicircular discoïdal one about the middle, and a third small lunular one at the apex. *Abdomen* projecting slightly beyond the elytra. *Legs* moderate, stout, with the knees black.

Length seven-twentieth of an inch.

Obs.—This very fine species was kindly presented to me by Sigismund Rucker, Esq., jun., who purchased it in a collection of insects from the East Indies. I have named it after our most indefatigable Secretary, whose Monograph on the *Paussidæ* in the Linnæan Transactions, will ever be a memento of his great skill and exertions in the science of Entomology, and in the present instance I have to thank him for the two excellent figures which accompany these two descriptions.

Plate 10, fig. 5 *a*, represents the maxillary and labial palpi.
5 *b*, represents the antennæ seen in front.
5 *c*, represents the tarsus above.
5 *d*, represents the tarsus laterally.
5 *e*, the underside of the abdomen.

XVI. *Descriptions of some new or but imperfectly known Species belonging to the Coleopterous Family* Paussidæ. *By* J. O. Westwood, *F.L.S.*

[Read December 7, 1835.]

Since the publication of my Monograph upon the *Paussidæ*, in the 16th volume of the Linnæan Transactions, I have obtained a knowledge of several new species of this extraordinary group of beetles, and also gained a more perfect acquaintance with others, which, at the period when this Monograph was written,

I only knew through the descriptions of preceding authors. Of these, as well as of the former, I have been induced to believe that descriptions and figures, in conjunction with those described by our colleague Mr. Saunders, might not be unacceptable to Entomologists by way of supplement to my former work. I have also added a notice of such other species as have been introduced into the family by authors subsequent to the publication of my Monograph, which, together with the present papers, will consequently comprise all that has been hitherto written upon the subject.

Paussus Klugii, Westw. Plate IX. fig. 2.

P. niger; antennarum clavâ parallelâ, margine postico serrato; thorace bipartito, maculis duabus aureo-sericantibus ornato; elytris piceis, margine laterali ferrugineo.

Long. corp. lin. $3\frac{1}{5}$.

Habitat apud Promont. Bonæ Spei. D. Krebs.

In Museo Reg. Berol. et nostr. Amicissimè commun. Dom. Klug.

Syn. *P. runcinatus*. Klug, MSS.

Caput nigrum, punctatum, subrotundatum, anticè emarginatum, posticè in collum parvum constrictum; lineâ impressâ e clypeo ad verticem extensâ; antennæ nigræ, punctatæ, clavâ magnâ angustiori, lateribus subparallelis, margine antico fere recto et acuto, postico vero multo crassiori et in naviculam longam excavato, cujus pagina superior integra, inferior vero tuberculis 6 marginalibus instructa. *Thorax* capite multo major, bipartitus, parte anticâ ad latera angulariter productâ, et in medio transversè et acutè elevatâ; parte posticâ e præcedente, excavatione magnâ et irregulari separatâ, in quâ maculæ 2 magnæ laterales aureolæ-sericantes; thoracis basis punctatissimâ. *Elytra* thorace dimidio latiora, lævia, nitida, picea, marginibus lateralibus apiceque rufescenti-luteis, humeris impressis angulisque posticis tuberculo parvo instructis. *Pedes* nigri, geniculis tarsisque piceis, crassi, dilatati, pari postico latiori; tarsi distinctè 5-articulati. *Abdomen* rufescens, elytris haud obtectum, infra segmentis ventralibus 5 simplicibus; 2, 3, et 5 minoribus.

In honorem Dom. Klugii, Entomologorum Germanicorum principis, Soc. Ent. Lond. Socii honorarii, quo hæc species amicissimè mecum communicata est.

In the collection of M. Lucien Buquet is contained an insect belonging to the family *Paussidæ*, to which is attached the manus-

cript name of *Xiphocera brunnea* of Latreille. Having been kindly permitted by its conscientious possessor to examine and figure this insect, I have not the least doubt of its specific identity with the *Paussus Klugii*, notwithstanding M. Buquet's insect is from Senegal, and Dr. Klug's from the Cape of Good Hope. The structure of the head, antennæ, and thorax, is precisely similar, the latter being furnished with the two sericeous patches which especially distinguishes this species. The elytra are similarly subnitidous, finely punctured with a marginal series of hairs. The specific name given to the insect by Latreille, *brunnea*, indicates its colour, which is entirely dark-castaneous, with the elytra rufescent at the side. In this respect it therefore differs from the typical specimens of *Paussus Klugii*, but as the specific distinctions of this family consist of structural variations, and not of differences of colour, I can only think this a variety of the former. Moreover, as it is also certain that variation in the formation of the antennæ is in this group only of specific and not of generic rank, I cannot adopt Latreille's idea relative to the generic distinction of this insect from the true *Paussi;* if indeed we were to proceed in the other manner, it would be necessary to form almost every species into a distinct genus.

It is a curious point in geographical Entomology, that a species of this curious and very rare genus should be so widely distributed as to be found both in Senegal and at the Cape of Good Hope. The same observation has however recently been made upon other insects.

Paussus Burmeisteri, Westw. Plate IX. fig. 3.

P. obscurè piceo-castaneus; elytris magis rufescentibus; capite pone oculos lateraliter spinoso; thorace bipartito; elytris angustioribus, pedibusque dilatatis.

Long. corp. lin. 3.

Habitat apud Promont. Bonæ Spei. D. Mund.

In Mus. Reg. Berol.

Syn. *Paussus contractus*, Klug. MSS.

Corpus totum obscurum, piceo-castaneum, pilis vel setis cinereis indutum; elytris, præsertim versus apicem, magis rufescentibus. *Caput* ovale, anticè attenuatum et in medio marginis antici impressum, pone oculos utrinque in spinam brevem productum, lineâque impressâ e clypeo ad verticem extensâ, ubi in excavationem parvam rotundatam desinet, in quâ tuberculum parvum videtur; antennarum clava magna ovalis, disco supra valdè irregulari, marginibusque irregulariter

sinuatis, basi externè in spinam parvam obtusam producta, et internè angulata. *Thorax* subovalis capite paullo latior et longior, bipartitus, scil. lateribus ante medium valde excisis, parte anticâ elevatâ, posticâ ejusdem latitudinis, et anticè profundè et irregulariter sulcatâ. *Elytra* thorace tantum paullo latiora, abdomen haud tegentia, ad humeros impressa, tuberculo parvo versus angulos posticos. *Pedes* sat breves; femoribus tibiisque valde dilatatis, complanatis, his ad apicem externè angulariter productis.

In honorem amici Henrici Burmeisteri, M. et Ph. D., Soc. Ent. Lond. Socii, &c., Entomotomi Halensis peritissimi.

Fig. 3 *a, b, c.* Antenna in different positions. 3 *d.* Labial palpus. 3 *e.* Part of head and thorax in profile.

Paussus Shuckardi, Westw. Plate IX. fig. 4.

P. ferrugineus; capite longitudinaliter, thoraceque tranversè sulcatis, hoc subbipartito; antennis gracilibus, subcylindricis.

Long. corp. lin. $3\frac{1}{2}$.

Habitat in Africâ Australi.

In Mus. D. Shuckard.

Syn. *Paussus cylindricornis*, Shuckard, MSS.

Caput ovale, ferrugineum, anticè vix emarginatum, sulco profundo e margine antico ad verticem extenso, lateribus inter oculos et basin antennarum elevatis. *Antennæ* punctatæ, ferrugineæ; articulo 1mo. subquadrato, ultimoque elongato prioris crassitudine, subcylindrico, basi externè subacuto. *Mentum* dente centrali fere obliterato, dentibusque lateralibus obsoletis. *Palpi maxillares* articulo ultimo minuto; *labialium* articulo ultimo subcultrato, apicè attenuato. *Thorax* capitis magnitudine et illo haud latior, lateribus anticè obtusè dilatatis, sulco profundo transversè divisus, parte anticâ elevatâ et in medio lineâ longitudinali subdivisâ. *Elytra* oblonga thorace duplo latiora, ad humeros impressa, posticè truncata, et ad angulos posticos tuberculo parvo armata, lævia, subnitida, ferruginea, abdominis fere longitudine. *Pedes* sat breves, compressi, haud dilatati, punctati, setis brevibus aurantiis induti; tarsis brevibus, tibiarum fere latitudine, distinctè 5-articulatis. *Abdomen* subtus 5-articulatum, articulis 2, 3 et 5 brevibus; 4to posticè spinis 2 parvis divergentibus armato.

In honorem Dom. Shuckardi, Soc. Ent. Lond. Socii, Hymenopterologi acutissimi nominatus.

Fig. 4 *a.* Head and thorax in profile. 4 *b.* Head beneath. 4 *c.* Maxillary. 4 *d.* Labial palpus. 4 *e.* Abdomen beneath. 4 *f.* posterior tarsus.

Paussus ruber, Thunberg. Plate IX. fig. 5.

In my Monograph (p. 635) I was compelled, in consequence of not having seen a specimen of this species, to introduce only a transcript from the character given of it by Thunberg, who stated it to be an inhabitant of the Cape of Good Hope, adding only a suggestion that this author had given an incorrect description of the structure of the head and thorax, by regarding the anterior portion of the latter as the posterior part of the former, and a hint that this species might possibly be identical with my *Paussus Linnæi*. Having, however, during my visit at Berlin found a specimen thus named on the authority of Dr. Klug in the Royal Museum of that city, I made a drawing and the following description of it, whence it will be seen that my conjecture relative to the structure of the head and thorax is confirmed, but that the insect is much more nearly allied to *Paussus excavatus* (an inhabitant of Senegal) than to *P. Linnæi*.

P. castaneo-ferrugineus, subnitidus, vix pubescens, sub lente punctatissimus, verticè impressionibus binis parvis ovalibus, capite anticè emarginato. Antennarum clava obovalis, margine antico subrecto et subacuto, impressionibus nonnullis transversis intra marginem ; margine postico multo crassiori et in sulcum magnum oblongo-ovalem excavato, serieque transversâ impressionum in pagina ejus inferiore, angulo externo basali hamato, denteque parvo obtuso in medio marginis basalis. Thorax bipartitus capite major, parte anticâ lateraliter in spinam utrinque productâ, parte posticâ longiori sed angustiori, anticè lateraliter subspinoso, disco profundè et irregulariter sulcato. Elytrorum apices externè tuberculati. Pedes subdilatati, complanati, rugosè punctati.

Long. corp. lin. $2\frac{1}{5}$.

Habitat apud Prom. Bonæ Spei. D. Krebs.

In Museo Reg. Berol.

Fig. 5 *a*. Antenna. 5 *b*. Labial palpus. 5 *c*. Head and thorax in profile.

Paussus cochlearius, Westw. Plate IX. fig. 6.

P. totus ferrugineus, subnitidus, flavo-pilosus ; antennis apicè eroso-cochleariis, capite lineâ impressâ longitudinali e clypeo ad medium verticis ductâ, thorace bipartito.

Long. corp. lin. $2\frac{1}{4}$.

Habitat in Africâ Australi.

In Museo D. W. Hooker, M. E. S.

Species parva. *P. rubro*, Thunb. valde affinis, e quo differt tamen structurâ antennarum, lineâ impressâ capitis, &c.

Caput subovale, depressum, anticè emarginatum, posticè in collum breve angustatum, lineâ impressâ e medio emarginationis ad medium verticis extensâ. *Antennæ* ferrugineæ, clavâ ad basin valde compressâ et externè in spinam productâ; margine antico omni acuto, dimidio apicali marginis postici dilatato, excavato, cochleario; margine ejus postico impressionibus quatuor longitudinalibus, lobos totidem formantibus. *Mentum* dente centrali fere obliterato. *Thorax* capite vix major, bipartitus, parte anticâ lateribus angulatis et posticè elevatâ; parte posticâ angulo ejus antico laterali prominente, transversâ, et in medio valde impressâ, tuberculis duobus minutis centralibus. *Elytra* oblonga thorace duplo latiora, ad humeros impressa, posticè truncata, angulo apicali utrinque laterali tuberculato, ferruginea, subnitida, setis flavescentibus induta, setis in lineas irregulares dispositis. *Abdominis* segmenta integra. *Pedes* satis elongati, tibiis præsertim dilatatis; tarsis brevibus, 5-articulatis.

Fig. 6 *a*, *b*. Antennæ in different positions.

Paussus armatus, Westw. Mon. Linn. Tr. 16, 646. Tab. 33. f. 62. Plate IX. fig. 7 *a*, *b*, *c*.

Having examined a specimen of this species now in the collection of the Rev. F. W. Hope from Sierra Leone, especially with reference to its trophi, the doubts which I expressed in my Monograph as to the propriety of placing it in the genus *Paussus* are removed, there being no important variation beyond specific distinctions to separate it from the other species of that genus.

The insect figured by Guérin in his Magazin de Zoologie, Insectes, pl. 49, and details, fig. 1 *b*, and 1 *c*, under the name of *Paussus cornutus*, *Chevrolat*, is identical with my *Paussus armatus*, as indeed M. Chevrolat had ascertained, the latter name being now attached to it in his collection. It is from Senegal.

Paussus curvicornis, Chevrolat. Plate X. fig. 1.

This species, figured by Guérin in his Iconographie du Règne Animal, Insectes, pl. 40, fig. 8 and 8 *a*, is founded upon an insect partially figured in the Mag. de Zool. Ins. pl. 49, and therein considered as a doubtful variety of the *P. cornutus* of Chevrolat (*P. armatus*). The details are therein represented in plate 49, fig. 1 *a*, 2, and 2 *a*.

More recently M. Chevrolat has communicated a note to M. Guérin, (Rev. Zool. No. 2, page 21,) containing the following description.

" Long 10 mill. D'un ferrugineux un peu obscur, avec l'extrémité des élytres plus pâle ; tête ayant sur le vertex une pointe conique, un peu courbée en avant ; corselet divisé transversalement par un fort étranglement, ayant une profonde impression à son lobe postérieur ; élytres presque lisses avec quelques tubercles très-petits, et une légère dilatation à l'extrémité et en dehors ; pattes d'une couleur plus foncée.

" Hab. Senegal."

Paussus Jousselinii, Guér.

Under this name M. Guérin has published the description of another new species belonging to the first section of the genus " *thorace quasi bipartito*," and most nearly allied to *P. microcephalus*, which it resembles in its antennæ, of which the club is armed with small teeth near the tip, but which is scarcely so thick as the basal joint, and nearly cylindric (somewhat resembling the antennæ of *P. Hardwickii*).

The following is M. Guérin's description of *Paussus Jousselinii*, in the Rev. Zool. No. 2, p. 21.

" Long. 7 mill. ; larg. aux épaules 2, et à l'extrémité 3 mill. Corps d'un brun foncé presque noir, avec l'abdomen et l'extrémité des élytres ferrugineux ; tête petite, ayant un sillon longitudinal en avant, et 3 tubercles en forme de cornes sur le vertex ; antennes rugueuses, avec le 1er article grand, presque carré, le second ou la massue subcylindrique, trois fois plus long que le premier, un peu rétrécie au milieu, ayant en dedans et à la base un appendice tronqué et, près de l'extrémité, trois fortes dents aigues ; corselet divisé en deux par un profond étranglement, ayant une profonde excavation longitudinale au milieu et deux taches orangées produites par un fin duvet, et placées de chaque coté et presque au fond de l'étranglement transversal ; élytres lisses avec un petite dent dilatée près de l'extrémité ; pattes rugueuses comme les antennes."

" Ce curieux insecte a été trouvé au Pégou, au bord de la rivière Yrrawady, à une journée de Rangoon ; il était posé sur un tronc de palmier."—*Guér. loc. cit.*

Paussus bifasciatus, Kollar. Plate X. fig. 3.

P. ferrugineus ; capite, antennarum apice, pedibus elytrisque nigris, his fasciis duabus ferrugineis.

Long. corp. 2‴, lat. 1‴.

Habitat in Indiâ Orientali.

Kollar in Annal. des Wiener Mus. der Naturg. Erst. Band. 1836. 2 Abth. p. 336, tab. 31, f. 7 *a*, *b*.

" Ad species minores hujus generis pertinet. *Caput* suborbiculare, nigrum, nitidum, sat remotè punctatum, impressionibus duabus lævioribus in medio; oculis lateralibus, vix prominulis, rotundatis, nigro-obscuris; instrumentis cibariis ferrugineis; antennis biarticulatis, articulo baseos brevi, subcylindrico, ferrugineo, articulo 2do dilatato, sublineari apicè rotundato, impressionibus quatuor utrinque conspicuis, quasi in articulos 5 diviso, ferrugineo, segmentis duobus apicis nigris. *Thorax* sat elongatus, subquadratus, anterius multo latior, lateribus rotundatus, pone medium subito coarctatus, totus ferrugineus, nitidus, lineolâ transversâ mediâ profundè impressâ, alterâ longitudinale minus profundâ, nec marginem anticum neque posticum attingente; hæ lineolæ crucem in medio thoracis repræsentant. *Elytra* thoracis parte anticâ latiora, oblonga, quadrangula, basi ipsa depressa, a thorace remota, subemarginata, humeris antrorsum prominulis, lateribus inflexa, immarginata, apicè truncata; abdomine breviora, convexiuscula, nigra, nitida, obsoletissimè punctata, nigra, fascia baseos lata, apicis angusta, ferrugineis. *Corpus* subtus ferrugineum, nitidum, punctatum. *Pedes* nigri, omnes subæquales, tibiis compressis, femoribus basi tarsisque totis ferrugineis."

Specimen unicum a Dom. Fichtel ex Indiâ Orientali Musæo allatum est.—*Kollar. loc. cit.*

Paussus Turcicus, Friv. Plate X. fig. 2.

P. oblongus rufus, capite elongato, opaco, thorace transversim diviso, elytris nitidis, apice dilatatis truncatis, maculâ mediâ communi longitudinali fuscâ.

Long. corp. lin. $2\frac{1}{2}$.

Habitat in montibus Turcicis " Balkan" dictis.

Frivaldszky, in Hungarian Trans. 1835, vol. ii. pl. 6, fig. 5.

Platyrhopalus Melleii, Westw. Plate X. fig. 4.

Pl. piceus; elytris castaneis latissimis, fere quadratis; antennarum clavâ latâ compressâ, margine fere circulare, basi externè angulum efformante; pedibus latissimis.

Long. corp. lin. $4\frac{1}{2}$; lat. elytr. lin. $2\frac{1}{2}$.

Pl. Melleii, Westw. Lin. Tr. 16, p. 683.

Guérin, Iconogr. Règne An. Ins. pl. 40, fig. 11.

Of this extraordinary insect, an inhabitant of Malabar, I ob-

tained a knowledge subsequent to the printing of my Monograph, and was therefore compelled to introduce a description of it by way of postscript. The plate accompanying my Monograph being at that time engraved, I was prevented from adding a figure of it. I have, therefore, now supplied the deficiency, adding numerous structural details, being convinced that so remarkable an object cannot fail to interest the Entomologist.

Plate 10, fig. 4, represents the insect magnified. 4 *a*. The head beneath. 4 *b*. The mandible. 4 *c*. The maxilla. 4 *d*. The labrum and labral palpi. 4 *e*. The antenna sideways. 4 *f*. The antenna seen from the front. 4 *g*. The posterior leg.

Platyrhopalus angustus, Westw. Plate X. fig. 6.

P. brunneo-castaneus, elytris angustioribus, singulo maculâ magnâ laterali, triangulari, nigrâ; antennarum clavâ magnâ rotundatâ, subconvexâ, externè versus basin incisâ, dente acuto.

Long. corp. lin. 3; latitudo elytrorum, lin. 1.

Habitat in Indiâ Orientali. Neemuck. Dom. Downes.

Corpus totum nitidum, parcè pubescens, brunneo-castaneum, subconvexum. *Caput* mediocre, anticè vix emarginatum, lineâ longitudinali impressâ verticem fere attingente; oculi magni, prominuli, laterales, nigri. *Antennæ* articulo basali depresso, parte internâ magis productâ, apice obliquo; clava thoracis magnitudine, margine omni acuto, supra et subtus subconvexa, fere rotundata, externè incisione latâ et profundâ versus basin, dente basali acuto. *Thorax* capite paullo latior, lateribus anticè rotundatis, posticè paullo angustior (sc. cordato-truncatus), impressione tenui transversâ pone medium. *Elytra* thorace dimidio latiora, angulis humeralibus prominentibus, rotundatis, tuberculo ordinario ad angulum externum posticum; brunneo-castanea, singulo macula magna triangulari nigra versus medium, suturam fere attingente. *Abdomen* apice nigro, subtus 4-articulatum, articulo basali maximo, 2ndo et 3tio brevibus. *Pedes* castanei; tibiis mediocriter dilatatis, apicè obliquè truncatis. *Tarsi* articulis basalibus late spongiosis.

This species was collected in the interior of India at Neemuck by Assistant Surgeon E. T. Downes, to whom I beg leave to present my thanks for an opportunity of describing and figuring so valuable an addition to this singular but very rare group of insects. He informs me that he caught a single specimen in his room at night by lamp-light, having observed it crawling on his

table. It is very closely allied to the species which Mr. Saunders has done me the honour to name after me, which is also from India, and which is distinguished from the present species by its larger size, its much broader outline, and particularly by the black colour of the base and apex of the elytra, which colour is indeed so extended over these organs as to leave the castaneous colour almost in the shape of a narrow St. Andrew's X. The parts of the mouth are similar to those of *Platyrhopalus Westwoodii*.

Plate 10, fig. 6 *a*, represents the antenna seen from the front, and 6 *b*, the underside of the abdomen.

Genus. Lebioderus, *Westw.* Plate IX. fig. 8.

Corpus depressum, latiusculum. *Caput* thorace multo angustius, posticè in collum breve contractum, subtriangulare; anticè emarginatum, angulis posticis pone oculos subacutè productis, verticè lineâ depressâ; oculis mediocribus lateralibus. *Palpi* maxillares maximi, 4-articulati, articulo 1mo brevissimo, 2ndo maximo, internè sensim ad apicem in lobum magnum acutum producto, articulis duobus apicalibus multo minoribus, subæqualibus, ultimo obovali apice in vesiculam parvam terminato. *Mentum* cum capite haud articulatum, transversum, angulis anticis lateralibus acutè productis, denteque parvo breviori centrali instructum; palpi labiales 4-articulati, articulo primo parvo, crasso, 2do minuto, annuliformi, 3tio longiori, ultimo præcedentis longitudine, graciliori, oblongo-ovato. *Antennæ* maximæ ut videtur 7?-articulatæ; articulo 1mo ovali, 2do? minutissimo, reliquis 5 latissimis, massam ovatam depressam et irregularem formantibus. *Thorax* (scil. pronotum) latus, elytrorum fere latitudine, depressus, lateribus anticis rotundatis et in lobum productis, posticè truncatis, portione posticâ thoracis multo angustiori. *Elytra* lata, oblongo-quadrata; humeris anticè et obliquè productis; angulis posticis tuberculo ordinario munitis. *Alæ* 2. *Pedes* sat graciles, paullo compressi; tarsis evidenter 4-articulatis, articulis basalibus subæqualibus. *Abdomen* elytris paullo longius, apicè acuminato, 4-annulatum.

This very curious genus appears to be intermediate between *Platyrhopalus* (with which it agrees in the comparative shortness of the terminal joint of the labial palpi, and in the structure of the maxillary palpi) and *Pentaplatarthrus*, with which it might be associated from the remarkable construction of the antennæ. It

is however quite distinct from these two genera, as well as from *Paussus*, by its general characters; so that I am compelled to establish a new genus for its reception, which I have named in allusion to the structure of the thorax which has some resemblance to that of *Lebia* and *Masoreus* in the narrowness of the posterior part, although it will be evident that in this new genus it is the anterior lateral angles and not the posterior part of the thorax, as in those genera, which are dilated into lobes. I am by no means convinced that the terminal part of the antennæ which I have described as 5-jointed consists of more than a single joint with several constrictions, not having been enabled to macerate or relax the insect of which I have seen but two specimens. For the like reason I have been unable to examine the structure of the internal parts of the mouth. The insect which in my Monograph upon this family, I have doubtingly associated with the *Platyrhopali*, under the name of *Pl. aplustrifer*, is not improbably a second species belonging to this new genus, having the thorax of a somewhat similar form; the antennæ are not so apparently articulated, although if, as I have conjectured, the antennæ of the type of this new genus be not articulated but merely constricted, there will be less reason to doubt the propriety of the association of *Pl. aplustrifer* therewith, especially as traces of constrictions are to be noticed upon the clava of its antennæ, and as the latter organs are similarly provided with spines.

Species 1. *Lebioderus Gorii*, Westw.

Testaceus, tenuissimè punctatus; elytris paullo saturatioribus, antennarum clavâ margine postico 4-dentatâ.

Long. corp. lin. $3\frac{1}{2}$.

Habitat in Insulâ Javâ.

In Mus. Dom. Gory et Buquet, Parisiis.

Testaceus, supra subdepressus, tenuissimè punctatus, nitidus. Caput porrectum, subtriangulare, anticè subemarginatum, angulis posticis pone oculos acutis et paullo productis, vertice lineâ impressâ notato. Antennæ pilosæ, clavâ 4-constrictâ et quasi 5-annulatâ, annulo 1mo omnium minori, transverso, tribus sequentibus latioribus, supra et subtus elevatis, ultimoque obtriangulari, apicè rotundato; annulis 4 ultimis ad marginem posticum dente parvo et gracili instructis. Thorax rufo-testaceus, nitidus, punctatissimus, in medio disci paullo convexus, lineâ impressâ centrali. Scutellum parvum, triangulare. Elytra rufo-testacea, nitidissima, punctatissima, thorace latiora;

humeris anticè et fere ad marginem posticum loborum thoracis productis. Pedes tenues, subcompressi.

I have dedicated this very interesting insect to M. Hippolyte Gory, a distinguished French Entomologist, member of the Entomological Societies of London and Paris, and author of various valuable works, who has been so obliging as to forward it to me from Paris, although unique in his rich collection, in order that I might describe and figure it for the Entomological Society of London.

Fig. 8 *a*. Trophi *in situ*. 8 *b*. Antenna in profile. 8 *c*. Underside of the body. 8 *d*. Tarsi seen laterally and from above.

Cerapterus Macleayii, Donovan.
Plate X. fig. 7.

This insect is known to Entomologists only by Donovan's figure and description; and as this author is known not to have paid so much attention to the minute details of his figures as are now required by Entomologists, I have thought that a figure of an insect sent to me from Paris by M. Gory, which, except in a few particulars, agrees with the general characters of this species, would not be unacceptable to the Members of our Society. It is from New Holland.

Piceus, antennis pedibusque rufo-piceis; capite thorace minori, obtriangulari, anticè rotundato, angulis posticis pone oculos acutè productis; posticè in collum breve contracto: thorace subcordato-truncato, capite majori; elytris thorace latioribus, oblongo-quadratis, angulis posticis tuberculo ordinario instructis; pedibus magnis, compressis; tarsis distinctè 5-articulatis.

Long. lin. 5.

The characters given above might, perhaps, be considered to indicate a species distinct from C. Macleayii; but I think when sufficient allowance is made for Donovan's inaccuracies in minute insects, and his figures and description are compared with those which I now offer, it would not be justifiable to give the insect above described as a species distinct from that figured by him.

Plate X. fig. 7 *a*. represents a tibia and tarsus.

Genus. Trochoideus, *Westw.*

In my Monograph upon the *Paussidæ* I introduced the *Paussus cruciatus* of Dalman into the family, under the generic name of *Trochoideus*, observing that the general habit of the insect, the

form of its head, thorax, and elytra, the length and slenderness of the legs, and the formation of the palpi, were characters which evidently intimated a connexion with other families. The insect upon which this genus was established, was found by Dalman in Gum Copal, or rather, perhaps, (according to the recent investigations of Mr. Hope,) Gum Animè. By the kindness of M. V. Andouin I now possess an insect belonging to this genus from Madagascar (which, in conjunction with Dr. Klug's descriptions of Madagascar Coleoptera, clearly proves that the Gum Animè insects are inhabitants of that remarkable country). I must refer to the Linnæan Transactions for a detailed account of this genus, and shall here only describe the parts of the mouth.

Labrum transversum, angulis anticis rotundatis, ciliatum. (Fig. 8 *b*.)

Mandibulæ corneæ, fere quadratæ, compressæ, dente terminali gracili, bifido, margine interno densè ciliato. (Fig. 8 *c*.)

Maxillæ magnæ planæ, lobo terminali maximo, internè recto, externè rotundato densè piloso, lobo interno minuto, acuto, ciliato. Palpi maxillares crassi, 4-articulati; articulo 1mo minuto—2do et 3tio magnis, obovatis—ultimo majori, ovato-conico. (Fig. 8 *d*.)

Mentum transversum, integrum, anticè angustius. *Labium* anticè in lobos duos laterales dilatatum. *Palpi* labiales 3-articulati; 1mo articulo minuto—2do majori, pateræformi—ultimo maximo, dilatato, apicè truncato. (Fig. 8 *e*.)

From these characters, and from the tetramerous tarsi, it is evident that the affinity of this genus is more strictly towards *Endomychus* or *Eumorphus*, as Dr. Klug has indeed noticed in his Jahrbuch der Entomologie.

The insect from Madagascar appears to differ specifically from that described by Dalman, of which the character is

Species 1. *Trochoideus cruciatus*, Westw. (*Mon. Pauss.*)

Ferrugineus, elytrorum basi apiceque fuscis, suturâ fasciâque mediâ brunneis.

Species 2. *Trochoideus Dalmanni*, Westw. Plate X. fig. 8.

Fuscus, vix nitidus, pubescens; elytrorum humeris, apice, maculisque quatuor discoidalibus mandibulisque luteis.

Long. corp. lin. $1\frac{1}{2}$.

Habitat in Insulâ "Madagascar."

In Mus. Reg. Paris, D. Gory, Chevrolat et nostr.

Caput nigro-fuscum, tenuissimè punctatum, pubescens. Mandibulæ luteæ. Antennæ fuscæ, pubescentes. Thorax fuscus, punctatissimus, pubescens, cordato-truncatus, marginibus lateralibus elevatis, canaliculâ dorsali. Elytra ovata, humeris paullo latioribus elevatis, fusca punctatissima, pubescentia versus humeros, ad apicem, maculisque 4- (2- et 2 paullo majoribus et transversis) luteis. Pedes graciles, fusci; tarsis rufescentibus, 4-articulatis, articulis 3-bus basalibus subequalibus haud dilatatis.

Plate X. fig. 8, represents *Trochoideus Dalmanni* magnified. 8*a*. The head and antenna from above. 8*f*. The antenna. 8*g*. The hind leg. 8*h*. The intermediate tarsus. 8*i*. The under side of the abdomen.

Species 3. *Trochoideus Desjardinsii*, Guér.

Brunneus, sericie flavescenti obtectus; ore, antennis, pedibusque fulvis.

Long. 4 mill.; larg. 2 mill.

Habitat in Insulâ Mauritii.

Guérin, Revue Zoologique, No. 2, p. 22.

"Cet insecte est d'un brun marron, couvert d'un fin duvét jaunâtre; la bouche, les antennes et les pattes sont fauves; sa tête est large, sans rétrécissement postérieur, avec les yeux saillans et le chaperon et le labre plus étroits et assez avancés pour couvrir les mandibules. Dans les deux individus que nous possedons, les antennes sont composées évidemment de quatre articles, dont le dernier forme un massue beaucoup plus longue que les trois premiers; mais l'un des deux a cette massue beaucoup plus épaisse, et nous semble être le mâle. Le premier article est plus long que les deux suivants réunis, arrondi, épaissi; en avant, dans le mâle et la femelle le second article est triangulaire, aussi long que large; le troisième est semblable au second, chez la femelle; mais dans le mâle il est très-dilaté en arrière et forme la base de la massue, qui est aplatie, à peine deux fois aussi longue que large, tandis que chez la femelle cette même massue est plus étroite moins trois fois sa largeur dans la longueur. Les palpes maxillaires sont assez longues et paraissent formés de trois articles; dont le premier est court, le second un peu plus long et épais, et le troisième encore un peu plus long que le second, conique terminé en pointe. Les palpes labiaux sont tres-courtes et terminés par un article largement obconique et creusé au milieu. Le corselet est en forme de cœur tronqué des deux côtés. L'écusson est triangulaire, plus large que long. Les élytres sont ovalaires, arrondies au bout, un peu bordées. Les pattes sont courtes, avec les tarses de cinq articles."—*Guér. loc. cit.*

Genus. Megadeuterus, *Westw.*

Since the publication of my Monograph upon the *Paussidæ*, I have had an opportunity of examining and delineating the insect therein mentioned, as contained in the collection of the late A. H. Haworth, Esq. under the name of *Cerocoma marginata*, but which I regarded as a second species of the genus *Megadeuterus*.

The type of this genus, *Paussus flavicornis*, is evidently very nearly allied to the genus *Malachius*, and the insect above mentioned is also to be regarded as possessing the same affinity.

In addition to the curious structure of the 2nd joint of the antennæ, the *Megad. Haworthii* is distinguished by two interesting peculiarities; the anterior tarsi are only 4-jointed, whilst the four posterior tarsi are 5-jointed, and the antennæ are only 10-jointed. In this latter respect, indeed, this insect nearly approaches several beetles ordinarily placed in the genus *Malachius*, such as *M. 4-maculatus*, &c. from North America, New Holland, &c., but in the former respect I know of no Coleopterous insect which exhibits a similar character.

Megadeuterus Haworthii, Westw. Plate X. fig. 9.

Cæruleus; labro, antennarum articulis 2 basalibus fulvis, margine toto thoracis, elytrorum suturâ lateribusque rufis.

Long. corp. lin. $2\frac{3}{4}$.

Habitat —— ?

In Mus. Hopei, olim Museo Haworthii.

Caput porrectum, cærulum, punctatum, pubescens; anticè lineis nonnullis impressum. Labrum magnum, semirotundatum, fulvum. Mandibulæ dentatæ. Palpi cylindrici, parvi, labiales brevissimi. Antennæ 10-articulatæ; 1mo articulo crasso, 2do maximo, subquadrato, convexo, supra et posticè excavatione magnâ, cujus latera utrinque in dentem obtusum producuntur; articulis reliquis nigris, minoribus, serratis, ultimo ovali. Thorax angulis anticis acutis, posticis vero rotundatis; disco nigro, margine omni rufo. Scutellum parvum, rotundatum. Elytra oblongo-ovata, subdepressa, thorace latiora, cærulea, punctata, pubescentia, suturâ marginibusque rufis; rufescentiâ paullo ante medium elytrorum nonnihil dilatatâ. Pedes nigri, geniculis tarsisque rufescentibus.

Plate X. fig. 9, *Megadeuterus Haworthii* magnified. 9*a*. The head from above. 9*b*. The head from beneath. 9*c*. The three basal joints of the antenna. 9*d*. The fore leg. 9*e*. The posterior leg.

XVII. *Note respecting the Larva of* Blaps Mortisaga. By Robert Patterson, Esq., *V. P. Nat. Hist. Soc. Belfast. With a Description of the Larva. By* A. H. Haliday, Esq., *M. A.*

[Read January 4th, 1836.]

On the 2d of June, 1834, I had the pleasure of spending the day at Bangor, in the county of Down, accompanied by Dr. J. L. Drummond, and one or two other friends. In the afternoon of that day, Dr. Wilson, of Bangor, handed to Dr. Drummond a living "worm," which he informed him had been passed by a child only three months' old, and that a similar "worm" had been passed by the same child about a fortnight before. Dr. Drummond knowing that it was the larva of some Coleopterous insect, placed it under my care. I therefore, on my return home, procured a small vessel, half filled with fine garden mould, and in this the larva was deposited, and the soil occasionally moistened with a few drops of water. On the 2d of August I removed a little of the earth, to ascertain the condition of its occupant; it was then perfectly developed as a pupa, but soft and white. Whether it sustained any injury either by the replacing of the earth, or by its conveyance from Bangor, is a point I am unable to decide; but on revisiting it on the 11th of August, I found that the unknown "worm" had proved to be the larva of the *Blaps Mortisaga*, and had become transformed into a specimen of that insect, black, hard, and perfect in all respects, except that the termination of the elytra was wanting; on one side more so than on the other.

The *Blaps Mortisaga* is an insect of rather rare occurrence in this neighbourhood. My friend, Mr. G. C. Hyndman, of this town, who has been for many years an indefatigable Entomologist, informed me some time ago, that he had never seen this beetle in a living state. I have been rather more fortunate, as I have captured two specimens in an old dwelling-house in this town, but those were the only two I had ever met with. This scarcity of the beetle, conjoined with the case published by Dr. Pickells, of Cork, made me think the matter worth a little further inquiry. Accordingly, being in Bangor on the 14th of September, I went in company with Dr. Wilson to the house whence the *caterpillar* had been obtained. The grandmother of the child, the same person who had brought the larva to Dr. Wilson, now seemed inclined to deny her former statement. She said she might be mistaken—

that she had seen "worms" of the same kind on the earthen floor of the cabin since that time—that her daughter, to use her own words, "had bid her no to say that sic an unhumanlike thing could come frae her wean"—and finally, that if she saw any more of the worms she would bring them to the Doctor. Accordingly I received two more of the larvæ four days afterwards, and was satisfied from that circumstance that the first statement must have been founded in error.

One of these caterpillars was placed on a table, and under a watch-glass, that a drawing of it might be made. It moved so much about, pushing the glass with it, that a weight was placed close to the glass, and two copper coins at different parts of the circumference. It continued pushing until it had raised the edge of the glass on one of the halfpence, when it easily effected its escape. Being placed in a vessel of loose earth, it immediately began to bury itself, moving round any lump which was too hard to be easily penetrated. In less than two minutes no portion of the body was visible. I had hoped to have been able to make some observations as to its food and habits, but circumstances occurred which prevented me for some weeks from giving it any attention. At the expiration of that time I found it lying dead on the surface, the victim of my neglect; and its size very materially diminished. The other individual had been placed in spirits as soon as received, and thus retains its original dimensions.*

Description of the Larva. *By* A. H. Halliday, *Esq.*

[Read 1st February, 1836.]

The Iuliform larva of *Blaps mortisaga* bears, as might be expected, the closest resemblance to that of *Eryx niger*, figured and described by Mr. Waterhouse in the First Volume of the Transactions of the Entomological Society: the only parts which afford distinctive characters in slight modifications of form, being the last segment, the legs, and the mouth.

The body of this larva is nearly cylindrical, but the belly is flat and a little retired within the descending margin of the dorsal

* In a note subsequently received from Mr. Patterson, he states that in crawling along, the larva makes use of two fleshy appendages on the under side of the terminal segment of the body, near the anal extremity, as feet, in the same manner as the larva of *Tenebrio molitor* figured and described by De Geer.

shields. The head is rounded in front and square behind, finely villous at the sides; the epicranium, clypeus, and labrum are transverse; the sides of the clypeus converging in front; the anterior angles of the labrum rounded, and its border ciliated. The antennæ, half as long as the head, consist of two nearly cylindric joints, (the first of which is thicker and shorter than the second,) of a scape nearly immersed in the socket, and of an exceedingly minute terminal joint, crowned by a hair; this in dried specimens is withdrawn into the extremity of the preceding joint. The mandibles are horny, broad, rounded at the back, incurved at the tip, the inner edge unequally toothed, the left mandible having a stronger tooth within the tip. The maxillæ and labium are seated in a large semicircular sinus of the under-face. The maxilla is compressed, with the scape (*scapus*) apparently biarticulate; the shaft (*stipes*) straight, somewhat hairy; the blade (*lacinia*) inarticulate, simple, armed on the inner edge with spines closely set. The palpus is scarcely longer than the blade, tapering, 3-jointed, the second joint longer, the third small, conic. The scape of the labium is large; the stem oblong, almost rectangular, with a few lateral hairs; the palpiger transverse, broader before, with the margin entire; the ligula produced in a point bearing a bristle; the palpus half as long as the maxillary, of two joints, the second minute.

The segments from the second (*prothorax*) to the twelfth inclusive are nearly equal, (only the mesothorax and metathorax are a little shorter than the others); smooth, glabrous. The thirteenth is nearly semicircular above, but produced to a point which is curved upwards, and armed with a small spine above; there is a row of smaller spines down each side from the middle to the tip: beneath, a fleshy protuberance is interposed between the twelfth segment and the horny shield of the thirteenth; this performs the office of a foot, and is furnished with a contiguous pair of minute, ovoid, attenuate appendages. The legs are short and compressed; the fore-pair largest, with the coxa square, finely villous; the trochanter has a small convex ridge on the under-side near the tip, armed with a few short spines; the thigh also has a few spines beneath near the base; is broad, nearly triangular, finely villous; the shank has a row of bristles on the inner side. The foot is a simple slightly curved claw, with a thickened root, which bears a bristle on the inner side.

The length is about an inch, the breadth a line and two-thirds. Colour a dirty ivory white, the incisures ochreous, the mandibles and claws chesnut brown.

Obs.—This description was drawn up from a comparison of two specimens, one dry, the other in spirits. The parts of the mouth were examined *in situ* only.

Plate XI. fig. 1. Larva of *Blaps mortisaga*, the upper side.
1 *a*. Last segment of ditto, upper side.
1 *b*. Last two segments in profile.
1 *c*. Head of ditto, upper side.
1 *d*. Ditto, under side.
1 *e*. Maxillæ and labium of ditto, as seen *in situ*.
1 *f*. Antenna of ditto.
1 *g*. Foreleg of ditto.

XVIII. *Some Account of the Genus* Myocoris, *of the Family* Reduvini. *By* Dr. Hermann Burmeister, *Fellow of the Naturalist Society of Berlin, For. M. E. S., &c.* (*Communicated by* J. O. Westwood.)

[Read February 1, 1836.]

In the second volume of my Manual of Entomology (*Handbuch der Entomologie*) I have given the arrangement of the great group of *Land-Bugs* (*Geocores*), which is considered in England to form with the *Water-Bugs* (*Hydrocores*) a separate order, under the name of *Heteroptera*. I have divided the whole group of land-bugs into eight families, of which the *Reduvini* are the third. All the very numerous and different forms, introduced into this family, I have distributed into thirty *genera*, the characters of which are exhibited chiefly in the legs, principally in the *unguiculi* and the *tibiæ*. I have shown (page 219 and 221), that the *unguiculi* have two forms, namely, they are, 1st, short, compressed, and furnished with a large tooth on the base of the under-side; or, 2ndly, elongated, round, bowed, and at the same place furnished with a fine bristle, which is nearly as long as the whole *unguiculus*. This second group must be divided into three sections from the construction of the extremity of the *tibiæ*. The first section (*a*) has a pit on the fore side of the *tibia*, in which the *tarsus* may be concealed; the second (*b*) has a large or long and narrow sole on the under-side of the four anterior *tibiæ*; the third (*c*) has neither the one nor the other of these structures. Our genus *Myocoris* belongs to the first group with the large *unguiculi*.

This group is composed of six genera, *Zelus*, *Myocoris*, *Euagoras*, *Notocyrtus*, *Arilus*, *Harpactor*, which have many characters in common, and may be described at once. These characters are exhibited in the *antennæ*, the *head*, the upper side of the *prothorax* (which I name *pronotum*), and in the legs.

The *antennæ* are always formed of four joints, the length of which is nearly the same in all these six genera. The first joint is the longest, and has at its base a node, (tab. 11, fig. 6,) which seems to be a distinct joint, but it is only a continuation of the great joint. Between this first joint and the second, we may observe a small globose joint, which is very inconspicuous in the smaller species, but evident in the larger; for instance, in *Arilus serratus* (*Red. serratus*, Fabr.) and others. These little joints, named by me *articulating joints*, are found between the larger joints of the *antennæ* in the whole group of land-bugs, but in many genera these joints are so small that we cannot see them. The second great joint is the shortest of all, two or three times shorter than the first, but of the same form. The third joint has often the length of the first, but sometimes it is shorter, and a little longer than the second. Very rarely I have observed this joint incrassated (in *Zelus crassicornis*, Man. of Entom. vol. ii. pp. 225, 3, 1, and others), still more rarely I have found the first joint incrassated at the end. The fourth joint may be distinguished from the third with difficulty; but in many species the limits of both may be more evidently seen. Sometimes, if the third joint is short, the fourth is longer than the third; but the fourth is shorter than the third, and a little longer than the second.

The head is in all these genera horizontally porrected, but its form is sometimes globose (*Myocoris*, *Notocyrtus*), sometimes more cylindrical with a short neck (*Zelus*, *Euagoras*, *Harpactor*), or long (*Arilus*). In this last genus the neck begins by degrees, in the others it is separated from the *occiput*, and constricted behind the head. The *antennæ* are placed on the front, and behind them in many species (all of the genus *Zelus*, but not of *Euagorus*, the majority of the genus *Arilus*, but not of *Harpactor*) we find two spines. The semi-globose eyes are placed on each side of the head, and beneath these, upon an elevation at the upper side, are the two *ocelli* (fig. 2). The *rostrum* arises from a tubercle between the *antennæ*, and lies on the *gula*, reaching the *prosternum* between the fore-legs. The three joints forming it are very different, but the third is always the shortest, and the two others of equal length.

The *pronotum* forms a trapezium, with dilated margins, which

is constricted before the middle, near to the fore-margin. A longitudinal furrow divides the *pronotum* into four parts, of which the two anterior are rough, and the posterior bear in one genus four spines (*Zelus*). In the genus *Notocyrtus* its construction is very curious, for the hind division forms a great tubercle, which covers the fore-part of the *scutellum;* in the genus *Arilus* some species have the same tubercle, covered with warts (ex. *Aril. tuberculatus, Red. tuberc.* Gray, in Griff. Anim. Kingd. xv. pl. 91); other species exhibit a large comb (*Ar. serratus*) at the same place, and others, two longitudinal *carinæ* (ex. *Zelus elevatus*, Fabr.)

The wings, longer than the body, have, as in all *Reduvini*, a marginal costal nerve, and another in the middle, forming a fork, between the twigs of which and the marginal costa we observe three irregular cells (see the figure). In all the genera the base of the upper wing, as far as the fork, is corneous, except in the genus *Myocoris*, in which the whole wings are membranaceous, and this circumstance affords the best character for this genus.

The legs are in all the six genera uniform, elongated, slender, with very small three-jointed tarsi (fig. 3), and large unguiculi furnished with a tooth at the base (fig. 4). Some species of the genus *Myocoris* have many slender hairs covering the hinder tibiæ, and in the genus *Notocyrtus* the same tibiæ have the form of a spindle, that is, they are incrassated in the middle, and pointed at the ends.

The characters of the genus *Myocoris* are as follows:

Caput globosum, collo brevi instructum.
Antennæ filiformes, quadriarticulati.
Rostrum breve geniculatum, articulo primo et secundo æqualibus.
Alæ 4 omnino membranaceæ.
Pedes elongati, graciles; tibiis subaduncis, apice obliquè truncatis; tarsis triarticulatis, minutis; unguiculis dilatatis, basi dente unico instructis, subbifidis.

I am acquainted with ten species of this genus, of which nine are inhabitants of Brazil, and one of Sumatra.

A. Caput bicorne.

a. Caput pallidum.

1. *M. gilvus*, Klug.

Totus testaceus; antennis, fasciâ inter oculos, oculis, elytrorumque membranâ nigris. Long. 5‴.

Broader than the other species, the eyes more prominent, the rostrum rather shorter, the tip brownish. Wings at the base more coriaceous, before the extremity of the hemelytrum [or corium] a black spot, which is connected with the black [apical] membrane. Legs yellow, the tarsi brownish, (the hind legs wanting).

Sumatra. From the Collection of Daldorf.

Adnot.—The two first joints of the rostrum being of equal length, I must introduce this species into this genus, but the form of the body and the structure of the upper wings remove it from the others.

b. Caput nigrum.

a. Pronoto pallido.

2. *M. nigriceps*, mihi.

Lateritius; antennis, tarsis, tibiarumque posticarum apice nigris; elytrorum stigmate apiceque nigro-violaceis. Long. 9‴.

Burmeist. Man. of Ent. ii. 226, 4, 1.

The sinciput, the first joint of the rostrum, and the antennæ black, the two posterior trochanters, the extremity of the posterior tibiæ and the tarsi of the same colour; the other parts of the body yellow; the membrane of the upper wings with a brown band at the base and like-coloured tip.

From Bahia.

3. *M. tipuliformis*, mihi.

Fuscus; prothorace, abdomine pedibusque testaceis; genibus tibiisque posticis nigris. Long. 8‴.

Head and antennæ black, neck and the second and third joints of the rostrum yellow. Pronotum red-yellow, the shoulder-angles pointed; the other part of the thorax, especially the hind part, brown; scutellum red-yellow. Wings yellow, at the base brownish, with a black-brown band in the region of the stigma; apex brown. The abdomen yellow, at the sides brownish. Legs yellow, the knees black; fore-thighs with an indistinct band, the four hinder legs with black trochanters, tibiæ, and tarsi; the tibiæ covered with fine hairs; the wings very much longer than the abdomen.

From Rio Janeiro.

4. *M. dama*, Klug.

Fusco-niger, prothorace et mesothorace sanguineis. Long. 5‴.

The whole body is black but the neck; the extremity of the rostrum, the prothorax and mesothorax, red; the anterior tro-

chanters red, the others black. The legs black, the four hind thighs with a fine whitish yellow band. Abdomen yellow, the third, fourth, fifth and sixth joints with a black spot at the under side.

From Para.

5. *M. personatus,* mihi.

Testaceus ; capite cum antennis, rostri medio, tibiis posterioribus femoribusque mediis nigris ; elytris fasciatis. Long. 6‴.

The neck, the base of the rostrum, and its second and third joints, are yellow ; the other parts of the head black. Fore-legs yellow ; the intermediate trochanters and the extremity of the tibiæ, and the middle of the posterior thighs, yellow. Wings yellow, a band on the middle and the extremity black-brown.

From Para.

B. Pronoto nigro.*

6. *M. gracilis,* mihi. Plate XI. fig. 5.

Niger ; femoribus elytrisque pallidis, his fasciâ apiceque nigris. Long. $4\frac{1}{2}$‴.

Black, extremity of the rostrum yellow ; fore and middle legs yellow, the tips of all and the trochanters of the intermediate legs black, the posterior black, but the middle of the thighs yellow. Wings yellow, with a large black band in the middle, and a black tip.

From Bahia.

2. Caput inerme.

a. Pronotum nigrum.

7. *M. pompilodes,* Klug.

Fusco-niger ; abdomine femoribusque testaceis ; alis gilvis, fasciâ mediâ apiceque fuscis. Long. 7—9‴.

The colour is black-brown, but the tip of the rostrum, the hind margin of the pronotum, the middle of the breast, the four anterior trochanters and the thighs, yellow ; the intermediate with a brown tip, the hinder brown at the base and the tip, both with an indistinct brown band. The tibiæ black, with short and dense hairs, and a yellow base, which is longer on the fore-legs. The wings yellow, with a large black band in the middle, and a black tip. The abdomen reddish, with the tip black-brown.

From Cameta, in South Brazil.

* My specimen of *M. gracilis* has a large conical patch of yellow on the posterior part of the pronotum. (J. O. W.)

b. Pronotum nigro-rubroque varium.

8. *M. bicolor*, mihi.

Corpore sanguineo; capite, pronoti maculis, pedibusque nigris; femoribus posterioribus fasciâ flavâ. Long. 7‴.

Head black, neck and the fore half of the pronotum red, the hind part black with a red spot at the margin; scutellum red. The breast red, with a black point upon each trochanter. Legs black, the trochanters red, the four hind thighs with a small yellow band in the middle. Wings black, the stigma alone yellow.

From Brazil.

c. Pronotum rubrum sive testaceum.

9. *M. braconiformis*, Klug.

Ruber; capite, femoribus basi, metathorace nigris; elytris gilvis, fasciâ mediâ apiceque nigris. Long. 6‴.

Stoll. Cim. tab. 21, fig. 147; Burmeist. Man. of Entom. ii. 226, 4, 2.

Head and antennæ black, the second joint of the rostrum reddish. The fore-trochanters and the metathorax black, the other parts of the body red, the anus brownish. All the thighs at the base black, as are also the hind tibiæ and tarsi. Wings yellow, with a brown band in the middle and a brown tip.

From Para.

10. *M. barbipes*, mihi.

Sanguineus; capite cum antennis tibiisque nigris, posticis tomentosis. Long. 10‴.

The largest species of the genus. The colour sanguineous, but the head (except the neck), the antennæ, and the base of the rostrum, black. The hind trochanters brown, all the tibiæ black, densely covered with short stiff hairs, the tips reddish. Wings yellow, with a brown band before the apical membrane, stigma orange-tawny, the end brownish.

From Rio Janeiro.

XIX. *On the Ravages of the Turnip Fly* (Haltica nemorum), *with Experiments.* By T. S.*

[Read 1st February, 1836.]

The most abundant species of beetle which feed upon the turnip are those noticed in the present paper, but there are at least two other, probably more, kinds which also devour this vegetable, (*Haltica similis* and *Haltica flava*), though not by any means so common.

Of the two species, some of whose habits are now to be detailed, both appear to be equally abundant in this district: they are both equally active, disappearing upon the slightest sound or motion, retreating either under the surface of the leaves upon which they are feeding, or vaulting to a considerable distance from them, returning again in a few minutes, if the sound or motion be not continued. The parent insects pair in July, if not in the earlier months. They are to be seen in the earliest fine days of February, (one species at least, *H. nemorum*), and do not disappear before the end of October, if the weather be warm: but they do not appear to feed much after the latter end of September. They seem capable of enduring long abstinence, as three specimens of *H. oleracea* were shut up in a box on the 24th of September, and, being forgotten, were not seen again for five weeks, when they were found alive and active; so that probably an idea entertained by some agriculturists of starving them, would be found difficult to act upon. I have never been able to find any under the bark of trees in the winter. They feed chiefly by night, when they may be found in great numbers on the surface of the young plants, sixty having been counted on a row of plants, just out of the ground, eighteen inches long, and one inch broad. In the day-time they retire, for the most part under the cotyledons, or young leaves, of the plants.

In order to ascertain whether the eggs were deposited upon the seed, as suggested by Rusticus, in the "Entomological Magazine," I tried the following experiments, similar, indeed, to his own.

* The writer hereof has communicated his name to the Council of the Entomological Society.

1834. Experiment 1.

July 12th. Some light sandy loam, richly manured, was exposed to a light temperature, and, when cold, placed in flower pots, previously boiled in water. Seeds of the following varieties of turnip:

No. 1. Red Pudding,
2. White Tankard,
3. Yellow Scotch,
4. Short-topped Swede,
5. Green Round,
6. Early Round,
7. Early Stone,

were then selected, and sown in separate pots, the pots covered with gauze, and placed in a greenhouse.

Experiment 2.

Seeds of No. 2 were sown in the same kind of soil, as in Exp. 1, but not baked, and the pots were plunged, unprotected, in the open ground.

Experiment 3.

Seeds of Nos. 1 and 6 were sown in the same kind of soil, baked, and plunged, uncovered, in the open ground.

Experiment 4.

Seeds of Nos. 3 and 4 were sown in unbaked soil, and the pots placed in the greenhouse: seeds of No. 7 in baked, and No. 5 in mixed, earth, were also placed in the greenhouse: all the pots unprotected, and not prepared by boiling in the three last experiments.

—— 15th. Seeds coming up in most of the pots.

Experiment 5.

All the varieties of seed sown in rows, eighteen inches long, in unmanured soil, in the open air.

—— 20th. Specimens of *Haltica nemorum* found upon Nos. 2, 1, and 6, in Expts. 2 and 3.

—— 22d. One beetle (*H. oleracea*) found upon a plant of No. 6, (Exp. 1), pot protected.

Seeds of Exp. 5 coming up.

—— 24th. Green beetles (*H. oleracea*), and striped beetles (*H.*

nemorum), found upon all these last plants, but in greatest abundance at night.

1834. EXPERIMENT 6.

July 24th. Placed some of the beetles, found upon the plants of Exp. 5, under glasses upon plants, growing in small phials, in common soil.

July 25th. Plants of Nos. 3, 4, 5, and 7, of Exp. 4, unprotected, not touched at present. No other beetle seen upon the plants of No. 6, in Exp. 1, the solitary specimen having been removed when first seen.

——28th. Thinned the plants of Exp. 1. None eaten, and no appearance of beetles.

Thinned, also, the unprotected plants (Expts. 2 and 3) in the open ground: many eaten.

Aug. 7th. Thinned the plants of Exp. 1 a second time: none eaten. Thinned, also, the plants of Expts. 2 and 3: many eaten. Nos. 3, 4, 5, and 7, (Exp. 4), not touched: no fly visible.

—— 8th. Plants of Exp. 5 thinned, and transplanted; numbers of beetles upon them, and much eaten: sixty were found upon one row.

Sept. 24th. Some beetles (*H. oleracea*) found feeding upon turnips: three enclosed in a box. A very large beetle of this kind found.

——25th. *Haltica nemorum* seen. Turnip plants very little eaten after this time.

Oct. 31st. A specimen of *H. nemorum* seen.

1835.

Mar. 28th. Repeated Exp. 5.

April 7th. Seeds of Nos. 4, 5, 6, and 7, coming up.

—— 9th. Beetles of *H. nemorum*, and *H. oleracea*, feeding upon the young plants.

——10th. Seeds of Nos. 1 and 3 coming up.

——20th. Many beetles feeding. Sowed mustard, cabbage, and radish seed.

——22d. Sowed fresh seeds of all the varieties of turnip enumerated above. Many beetles feeding on the first sown plants.

——28th. Beetles found upon all the young plants of turnip, cabbage, radish, and mustard.

These insects may be found upon the first sown plants of mus-

tard and radishes in the earlier months of spring, the leaves of which are constantly perforated by them in almost every garden. From their extreme activity, it seems almost impossible to apply any destructive agent to them, but probably sulphur, in a dry hot season, scattered over the plants early in the morning of a clear day, would destroy them, as at a temperature of from 75 to 85 it would undergo slow combustion, and form sulphurous acid gas, which is very deleterious to almost all kinds of insects. Lime, if applied very late in the evening, or very early in the morning, before the dew was off, might have some effect upon them. They seem to be equally abundant in wet as in dry weather; but, in the former case, the growth of the turnip is greater than the consumption by the fly, and the insects are probably not quite so active. Watering the plants, therefore, would appear to be the easiest remedy under some circumstances.

The specimens confined under glasses appeared to be injured by the damp arising from the soil in which the plants grew, and most of them escaped upon replacing the plants for their food; after some weeks' confinement, some of both species (confined each separately) paired under confinement, but the bottles unfortunately, containing the earth in which eggs might have been deposited, were lost.

The foregoing experiments appear to me to prove the conclusions of Rusticus to be erroneous so far as the deposition of the egg is concerned, and to render it evident that the beetles are to be found in the immediate vicinity, ready to devour the plants as soon as they make their appearance. If I mistake not, the young plants of hedge-mustard (*Erysimum alliaria*) are frequently perforated by these insects, and probably charlock (*Sinapis arvensis*), and other wild plants, supply them with their earliest food.

Saffron Walden.

XX. *Description of a new Genus of Exotic Bees.* By J. O. Westwood, *F. L. S.*

[Read July 4, 1836.]

Ordo HYMENOPTERA.

Section Aculeata.

Family Apidæ.

Sub-family Xylocopides.

Mesotrichia, Westw. Tab. XI. fig. 7.

Genus *Anthophoram* cum *Xylocopis* arcte conjungens, cum hoc habitu et illo pedibus intermediis congruens.

Corpus magnum, latum et crassum.

Caput transversum, facie fere planâ. *Oculi* magni, laterales, ovales (fig. 7 *a*). *Antennæ* in medio faciei versus marginem internum oculorum insertæ, in ♂ 13-articulatæ; articulo 2do minuto, 3tio elongato, ad basin attenuato (7 *g*). *Labrum* parvum, bilobatum (7 *b*). *Mandibulæ* mediocres, elongatæ, curvatæ, apicè tridentatæ, dente externo latè truncato (7 *c*). *Maxillæ* longitudine mediocres, lobo apicali lato, ad apicem acuto, externè subtus insertionem antennarum semicirculariter excisæ, excisione setis rigidis et acutis armatâ (7 *d*). *Palpi maxillares* breves, 6-articulatæ; articulo 1mo minuto, 2do longiori, reliquis longitudine decrescentibus (7 *e*). *Mentum* angustum. *Labium* longitudine mediocre, palpis labialibus ejusdem magnitudine, 4-articulatis; articulo 1mo elongato, reliquis longitudine decrescentibus (7 *f*).

Thorax latus, subquadratus, pilosus. *Pedes antici* elongati; tarsorum articulis magnis, subtus planis et coriaceis. *Pedes intermedii* ♂ difformes, elongati; trochanteribus magnis, sub-triangularibus, obliquè truncatis; femoribus magnis, curvatis, et subtus versus basin dente magno et curvato armatis; tibiis ovalibus, marginibus ciliatis, disco coriaceo; tarsorum articulo 1mo tibiarum fere magnitudine, ad marginem densè et longè piloso, ad apicem internè penicillo longo et contorto ornato; articulo 2do penicillo graciliori ad faciem internam etiam ornato, articulis reliquis 3bus sat magnis et (præsertim ultimo) densè ciliatis (7 *h*). *Pedes postici* breviores, crassi; femoribus brevibus, curvatis; tibiis crassi, subcurvatis et irregulariter ciliatis, tarsorum articulo 1mo maximo densè piloso, reliquis minutis. *Ungues* antici et postici bifidi (7 *i*), intermedii vero

dilatati et truncati, uno ad angulum externum dentem parvum emittenti (7 *k*). *Alæ* anticæ angustæ, ad apicem subacutæ, cellulâ marginali angustissimâ, ad apicem appendiculatâ; cellulis tribus submarginalibus 1mâ et 2dâ parvis, nervo valde obliquo divisis; 3tiâ majori, subquadratâ; 4tâ rudimentali.

Abdomen magnum, subplanum, marginibus densè pilosis, ♂ segmentis 7.

Obs.—The situation of the genus *Xylocopa* has been the subject of much uncertainty, having been placed by Messrs. Kirby and Latreille* in different situations at various times amongst the genera of bees, and indeed by the last-named author its true affinities are held in doubt.

The insect above described clears up this difficulty in the most satisfactory manner; it has all the habitus of a *Xylocopa*, and the structure of its mouth very nearly agrees with that genus, but the extraordinary formation of the intermediate legs immediately reminds us of those of the males of *Anthophora*, and on comparing the general structure of these three genera, it will be evident that *Mesotrichia* forms a most admirable connecting link between the other two groups. The female is as yet unknown.

Species 1. *Mesotrichia torrida*, Westw.

Nigra; capite, thorace anticè, tibiis tarsisque 4-anticis albido- aut fulvo-pilosis; metatarsis posticis intus rufo-hirtis; alis fuscis, violaceo-micantibus; abdomine glabro; antennis nigris, subtus rufis, articulo primo subtus flavo; penicillis contortis pedum intermediorum nigris. ♂.

Long. corp. lin. 13½.

Expans. alarum, lin. 26.

Habitat in Africâ tropicali occidentali.

In Mus. Soc. Ent. Londinensis (olim Kirbii), et Soc. Hist. Nat. Belfast.

* In the first edition of the Règne Animal, and in the valuable memoir upon the distribution of the bees, published in the Hist. Nat. des Fourmis, the *Xylocopæ* and *Anthophoræ* are not far apart, but in all his other works Latreille placed *Xylocopa* near the commencement, and *Anthophora* near the extremity of the bees. By Kirby in the Monographia Apum Angliæ, and by Saint Fargeau in the Encyclopédie Méthodique, the two genera are considered as more nearly allied together, but not placed in immediate conjunction together.

XXI. *Description of a new Irish Crustaceous Animal.* By Robert Templeton, *Esq. R.A.*

[Read September 7, 1835.]

Zoea Pattersonii, *Templ.* Plate XII.

The body is irregularly cubical, the angles bevilled or rounded off. Superiorly the exterior is formed of a hyaline cartilaginous buckler, which sends outward a less dense, more membranous process, to envelope the eyes; another forwards and a little downwards, hollow and subulate, to form an acuminate rostrum, which, with a slight curvature, extends to a distance in front nearly equalling the length of the buckler. On each side, and about midway between the eyes and the posterior extremity of the dorsum, a smaller process is sent perpendicularly outwards, or rather inclining a little forwards. Behind the extended bases of these, and exactly in the middle line, arises the fourth and largest of these processes; it has its origin from a tolerably extensive base, which is distinctly observable by the thickening of the buckler, passes at first a little upwards as well as backwards, and then directs itself nearly horizontally backwards, the apex acuminated, curving slightly downwards, and ending beyond the fork of the tail, so as to make its entire length almost equal to that of the body and rostrum together. It is, like the others, hollow. Beneath the bases of these processes, the buckler extends nearly directly downwards, so as to envelope the sides and posterior part of the animal: the free edge being horizontal, slightly waved and curving up anteriorly to the bases of the ocular peduncles and rostrum, so as to leave the inferior and anterior part of the animal completely exposed.

The eyes are very large, and carried in an obconic tumid peduncle, curved somewhat backwards, and articulated to the buckler, through the medium of a membrane which admits of slight motion. When the eye is minutely examined, it seems composed of innumerable separate eyes, extending over the whole of the apical curved surface of the peduncle, and each so extremely small, that no separate facets are required, the smooth membrane enveloping the peduncle admitting of distinct vision: when traced inwards, each terminates in a deep brown pigmentum, which, being most obvious, gives the composed eye the appearance of being deeply immersed in the substance of the peduncle, and assuming,

when looked at from above a crescent form, equidistant from the cornea ; when examined from the side it presents an irregular lozenge.

Immediately interior to and beneath the eyes arise the superior pair of antennæ, from the outer sides of a rectangular mesial projection from the head of the animal forwards. They are elongate, robust, subconic, and as if jointed; and have their apices each with a little appendix carrying curved hairs, and another internal to it bearing a long waved spine and a shorter straight one. They are a little depressed, and stand nearly directly forwards, a short way removed from the rostrum.

Beneath and exterior to these, and curving somewhat outwards, will be found the next pair of antennæ, with an origin somewhat anomalous. They arise very far back, behind and exterior to some of the manducatory apparatus, and pass forwards numerously jointed nearly as far as the extremity of the rostrum. They are, like the last, depressed ; and the last joint, which is very long, extending from the base of the superior antenna, is a short way from its base turned, and sends off an articulated offset, which is half as long as the remaining portion of the antenna, and ends with two spines; after this bifurcation the larger portion of the joint diminishes gradually in thickness, is slightly waved, arches outwards, and ultimately ends in two pinnate spines. A few minute hairs extend backwards a little way from the apex.

The mouth seems composed of an upper lip and three pairs of members placed in progressive order.

The material forming the lip extends forwards, then arches downwards anteriorly and laterally so as to form a hollow scoop, nearly fixed in position, having scarcely any motion, and seeming, in consequence, rather intended as a protection to the mouth, or throat, than an organ actually used in seizing food; its free edge is furnished with very minute spatulate toothed hairs. Beneath the base of this lip is articulated by one angle, the first pair of manducatory appendages, trapeziform, reddish; the anterior and superior edges nearly straight and of equal lengths; the posterior longest and waved ; the anterior short, with three spines superiorly, and also waved so as to form a prominence at the angle opposite to the articulation. The gullet seems to have its position immediately above these appendages; but the specimen having unfortunately been dried on card, this part had so much collapsed as to render it impossible to be distinctly traced. The viscera for the same reason must be passed over unnoticed.

Behind and quite free from the play of the last-described bodies

on their articulation, is found the second pair in the series of appendages, placed vertically and transversely, each with its root exteriorly in immediate connection with that of the corresponding antenna; from its origin it passes inwards, gives off two processes, then has a direction somewhat downwards, curving forwards without losing its breadth, and ends abruptly by giving support to seven apical, short, acuminate, toothed spines. The superior of the two processes arises from the edge at nearly a right angle, curves inwards and forwards, and gives off from its apex two pair of curved spines. The inferior process is biarticulate, the first joint very short, with near its apex a long straight spine; the second, elongate, subdivides towards its apex, the smaller part ending in two thick short spines, the larger directed downwards, and having three long curved spines attached.

Proceeding backwards a very short way, we find the articulation of the last pair of appendages, which presents the form of a triangle nearly equilateral, placed longitudinally, supported by its apex, and with the base lobed and spiny. Still farther back, we reach the bases of the two pair of swimming legs; the "pattes très courtes et cachées sous le corps, à peine visible," I could find no trace of whatever, and believe they only existed in the imagination of Bosc, the first describer of the genus, or rather that their existence was inferred analogically when he had decided on the position of the animal in his systematic work. The legs arise from minute projections backwards of the fleshy part of the body, immediately external to the intestinal tube, the primary joint in both pairs being long, so as to project beyond the shell, robust, and in a slight degree arched forwards, laterally compressed, appearing more so perhaps than they ought to do, from the desiccation of the specimen, and ultimately offering two articulations at their apical extremity. The fore-leg is rather largest, and from the division it sends arching forwards a five-jointed member, terminated by a little pencil of hairs, and obviously designed to assist in the capture of the food of the little animal, as it is ever found in immediate connection with the parts of the mouth; the other part is two-jointed, of equal length, directed downwards and outwards, and has a minute apical articulated appendage carrying six very long waved diverging hairs. The posterior leg sends downwards or outwards likewise a subdivision in every way similar to the last, and backwards a very minute one composed of three joints; the mesial largest and furnished with a long spine, the apical with two small spines.

From the position it occupies adjoining the legs, the intestinal

canal passes upwards and backwards towards the hollow base of the posterior dorsal spine; it then curves downwards, accompanied by the aorta, within the descending dorsal lamina, till it arrives at the inferior embouchure, when it begins to pass backwards within the joints of the tail. This tail is composed of six or seven depressed joints, of which four present themselves externally, the first from behind two transverse spines or processes; its breadth about equals its length, and furnished posteriorly at each side with a little tooth directed slightly outwards. The two succeeding joints are precisely similar, towards the tips however slightly diminished in breadth; the terminal joint forms a crescent, or is widely forked, each bifurcation passing outwards, furnishing a tooth exteriorly, and three plumed spines internally, and then bending suddenly backwards, gradually diminishing in breadth, and terminating somewhat acuminate, the tips curving upwards.

In colour the animal is a brilliant brownish green, the green hue predominating about the eyes and front; the brown inferiorly and posteriorly, and assuming a somewhat reddish tint about the mouth, intestinal canal, and processes from the caudal joints. The base of the last joint of the tail is dashed with red, and a concolorous macula is in each of the furcæ about the position of the spines. The legs, antennæ, and processes, are hyaline.

Taken by Mr. R. Patterson, V. P. Belfast Nat. Hist. Soc., in the same place as the *Anomalocera Pattersonii* (Larne Lough, county Antrim), on the 9th of May.

Plate XII. fig. 1. Represents the animal as seen from above, and very highly magnified.

2. Seen obliquely from beneath, to show the edge of the buckler, and relative positions of the interior parts.

3. The greater part of one side removed to show the positions of the parts of the mouth and of the legs.

4. Part of this further enlarged, to show more clearly the mouth and appendages.

5. Part of the head, the eye being removed to exhibit the origins of the antennæ, and the connection of the inferior to the second series of oral appendages.

6, 6′. The last joint of the inferior antenna seen in two positions.

7. Tip of the same antenna.

8. One of the second series of oral appendages. 8*. Tip of the superior process of the same.

9. The articulated appendage at the tip of the larger division of the legs showing the mode of attachment of the six hairs.

10. One of the spines of the last joint of the tail, to show the manner in which it is plumed.

My friend Mr. Patterson informs me that, when alive, the pulsations in the tail were extremely visible, and amounted to 122 in a minute. He refers the specimen to a figure published by Mr. Thompson, of Cork, in his Zoological Researches, and remarks that he has no doubt of their identity. With this opinion I cannot concur, if the representation given by Mr. Thompson be correct, which I have no doubt it is. In this latter (*Zoea Thompsoni*), the body is proportionally much longer, the processes in length much shorter, the eyes differently disposed, and the tail, or abdomen, shorter, narrower, and with processes, no trace of which appear in the above. I have therefore, as it does not appear to agree either with *Zoea pelagica*, or *Z. clavata*, no hesitation in considering it a new species, and confer on it, with much gratification, the name of the discoverer.*

The genus *Cyclops* of Müller at present includes a number of species with characters sufficiently decided to warrant their being formed into subgenera. Dr. Leach long since separated *Calanus*. In a paper I had lately the honour to present to this Society, I detailed the characters of another, being the genus, *Sapphirina*, Thompson: *Anomalocera Pattersonii* forms a third, and two yet remain clearly distinguished from the other numerous species associated with them in the genus. Attending only to the external forms, since our knowledge of their minute structure is still too limited to be used with effect in assigning their place with precision, we may arrange them in somewhat of the following manner:—

Cyclops, Auct.

Antennæ long; annuli of the body suddenly diminishing in breadth, forming a tail.

Eye single, pedunculate; inferior antenna with a radical branch.

Anomalocera....Type, *A. Pattersonii*.

Eye deeply immersed in the head.

Superior antennæ moderately long. Inferior rather long.

* I have again to express my regret that the specimen I have had the good fortune to examine had not been preserved in spirits, as the degree to which desiccation had been carried leaves still some doubts in my mind as to the exact form of the joints in some parts; but this, I hope, will not long obscure the history of this genus, as I am aware my friend Mr. Westwood, the indefatigable Secretary of the Entomological Society, possesses some beautiful specimens preserved in a proper manner, and whose size is such as to admit of more minute and careful examination. [*Zoea Gigas*, Westw. in Philosoph. Trans. 1835, pl. 4, fig. A. with details.]

Inferior antennæ bifurcate; body elongate.

Omethia.... { Type *Cyclops rubens*, Mül. (*C. Castor*, Jurine.)

Inferior antennæ simple; body ovate.

Cyclops, Mül..... { Type, *C. Quadricornis*, Linn. (*C. vulgaris*, Leach.)

Superior antennæ extremely long. Inferior very short.

Calanus, Leach.....Type, *C. Finmarchianus*, Mül.

Antennæ very short; annuli gradually and moderately diminishing in breadth.

Annuli depressed; body broad, flat. Eye distinctly double.

Sapphirina, Thomps.....Type, *S. fulgens*, Tilesius.

Annuli subcylindric; tail ending with two long setaceous styles.

Neostathes..... { Type, *C. minutus*, Mül. (*C. staphylinus*, Desm.)

N. B.—*Monoculus claviger* and *M. crassicornis* require to be further examined. I have never met with any thing like them.

That *Anomalocera* is a type of the genus *Cyclops* will appear at once evident by comparing it with the characters which Jurine, Latreille, and others, have assigned to that genus, as anciently constituted, if we except the singular position of the eye, the number of the segments of the body (in which latter particular it however associates itself with *C. rubens* and *C. minutus*); and one or two minor points. It has four antennæ; the superior long, setaceous, multiarticular, in the male with a swelling, confined universally in this species to the right side. The inferior antenna filiform, and ending with a dense pencil of hairs; three sets of oral appendages and feet in pairs, attached to the successive posterior annuli of the body. The general form and the caudal appendages serve still more to confirm its affinity. From this species the genus *Pontia*, of M. Milne Edwards, leads to *Nebalia*, approaching the one by the cephalic development, and the other by its general habit. From the description of the parts of the mouth given by the same author of a species of *Nebalia*, I must imagine that considerable similarity can be traced between them and those I have described in *Anomalocera*. He however applies theoretic considerations, and assigns to them names in their successive order, on the propriety of which my knowledge of the subject will not admit of my expressing an opinion.

Zoea appears to me to have its proper position near to this genus, though apparently much wanting in the development of particular parts. If we could imagine the obliteration of the posterior segments of the body, or that the tail and anterior ring were so brought together, as to drive the intermediate rings under the anterior, and prevent every thing more than mere rudimentary portions of these rings to be traced, and the swimming feet alone with the other parts removed, we should then find remaining parts or modified parts analogous to those of *Zoea*. Thus, in the mouth, infinitely the most essential object for consideration, we should find, in the first place, a labium common to both, then three successive pairs of appendages performing analogous offices. The first pair (internal mandibles of Jurine) occupy a similar position. The next in series marked in the delineations of *Zoea* (fig. 8) unquestionably perform functions similar to those marked (fig. 11, 12) in *Anomalocera;* and lastly, the lobate body, adjoining the legs of *Zoea*, has its analogous part in (fig. 13) *Anomalocera*, and lies horizontally appended by one corner, which is a singular confirmation of the views I am now taking. Fig. 14 of the *Anomalocera* may likewise be looked upon as replaced by the anterior division of the leg of *Zoea*, so that without any straining, an affinity between the animals may be traced. The antennæ and eyes present the greatest sources of discrepancy, but not greater than is to be found in adjoining tribes, and indeed it is observable that, as we descend from the more highly organised species, greater diversities always occur in analogous parts not essential to the absolute existence of the animal, the parts of manducation being almost the only parts which preserve a constancy of character.

From an attentive consideration of the habits and forms of these minute animals, I should be much inclined to remove the whole of them from their present connection with the bivalve *Lophyropoda*, and allot them a much higher station in the system, in fact, to a position which is hinted at by Latreille, close adjoining *Mysis* of Fabricius, and forming from it a diverging branch nearly on a rank with *Squilla*, but not in the same series, for this latter is too intimately connected with the adjoining tribes to admit of being separated by these. I have just detected among those I brought with me from Mauritius, a species* which forms the transition from *Squilla* to the *Amphipoda*, and whose description I propose to present to the Society as an appendix to the present paper.

* *Zeuxo Westwoodiana*, Templeton.

XXII. *On the Apod Larvæ of the Hymenoptera, with reference to the segmental Theory of Annulose Animals.* *By* J. O. Westwood, *F.L.S.*, *&c.*

[Read April 6, 1835.]

It would doubtless be considered a startling assertion, were the student to be informed that a larva is a more perfect animal than its imago, and yet when we perceive in the former a series of segments equally developed and exceeding in number the articulations of the body of the latter, such is the conclusion which might ordinarily, and at the first sight, be deduced therefrom.

The apparent loss of segments, which takes place during the passage of insects in general to their final state, is one of great interest, not only as a remarkable physiological fact, but also with reference to the numerical distribution of segments in annulose animals, whereupon depends the accurate determination of those exceedingly difficult and subtle investigations, having for their object the analogical relations existing between the oral and locomotive organs of the *Crustacea*, *Arachnida*, and *Insecta*. In like manner the point at issue, between Mr. Mac Leay and Messrs. Latreille and Audouin, relative to the true analogy of the terminal segments of the thorax of the *Hymenoptera*, will receive much elucidation by an examination of this question.

Let us shortly, in the first place, notice the views upon this subject entertained by our greatest philosophical inquirers, Latreille, Mac Leay, and Kirby. The first of these authors, in his endeavours to resolve the various forms of all annulose animals to one general type, considered in a memoir upon the external organization of insects, that the body of an imago is composed of thirteen segments, allowing one for the head, five for the thorax, and seven for the abdomen, supposing that the wings are aërostatic in their origin and structure, auxiliary to the legs, and borrowed in part from the respiratory organs.

Mr. Mac Leay, in the *Horæ Entomologicæ*, adopted Latreille's ideas relative to the two segments which exist in the larva, but disappear in the imago of some species, although his observations thereupon show that his opinion was scarcely reconcileable thereto. He says, "If Latreille supposes that these two in the larvæ of *Oryctes* are transferred to the abdomen of the imago, it is not true in fact, since no more than seven can be found in the abdomen; nor would it, if true, coincide with his theory, making wings take

the place of deficient feet. The thoracic [prothoracic] segment of *Coleoptera* is evidently the one bearing the first pair of feet. We have next four pair of locomotive organs attached to that part of the trunk commonly considered as consisting of only two segments. Now for Latreille's theory to stand, it is necessary to resolve these two segments into four, which, although not yet effected, I confess I think by no means improbable." He then proceeds to show that those segments which bear the true organs of locomotion constitute the thorax, and adds, "Those unacquainted with the conformity of nature to certain general principles, will have great difficulty to understand how the wing of an Hymenopterous insect can be one of its feet; yet this is not so dissimilar as the fore-foot of a quadruped and the wing of a bird often agreeing, almost to the number of digiti." (*Horæ Entomologicæ*, p. 414.)

Messrs. Kirby and Spence partially adopted these views of Latreille and Mac Leay, observing that Mr. Mac Leay's opinion seems to receive some confirmation from the circumstance that, in the larva state, insects consist of two segments more than in the imago; these *follow* the three *pedigerous* segments succeeding the head; they have no prolegs, and are supposed to belong to the thorax, rather than to the abdomen. To make this circumstance bear upon the question, it must be proved that in the perfect state these segments in some manner become the back of the trunk and bear the wings. This would not be more wonderful than many changes that are known to occur in insects. Here it will be seen that these authors rely upon the certainly forcible circumstance that the fifth and sixth segments of the body of those larvæ which are furnished with false legs, are destitute of those organs, although instances might be mentioned in which one at least of these segments bear legs, and although in the *Crustacea* the analogous segments are provided with perfect legs.

Mr. Mac Leay however, in his recent memoir in the Zoological Journal, has adopted the views of M. Audouin, considering that the differences which have been pointed out in respect to the number of segments in perfect insects, result more often from imperfect study or unpractised examination on the part of the person describing, than from any real anomaly in the animal described, instancing in confirmation thereof his own observation on the abdomen of the *Oryctes*, as mentioned in the *Horæ Entomologicæ*. "This truth," he adds, "will be evident to any Entomologist who takes the trouble of comparing the perfect insect with the pupa, and this again with the larva. Let any large beetle be taken, for instance, one of the *Dynastidæ* or *Prionidæ:* at first sight it

seems to have no more than eleven segments* in the vertebral axis, but on more accurate examination, and particularly on comparing it with the pupa, we discover that in reality it has thirteen, that is, the number of the larva. Every annulose animal may be resolved into thirteen primary segments, which are thus disposed—one for the head, three for the thorax, and nine for the abdomen. Let us observe a *Phasma*, where the *female* is apterous and the male winged. In many *females* of this genus we may perceive the rudiments of the wings, and consequently the inspection of a female will point out to us the structure of the male, considering this last as a perfect winged insect. Well, then, the female *Phasma* shows nine abdominal segments, three thoracic, and a head. The females of certain *Blattæ* are apterous, and in the island of Cuba there is a large species of this genus to be found, under stones in woods, whose wings are formed, but so short and truncated as to render their possessor incapable of flight. Such insects will also prove a winged *Blatta* to be composed of the above-mentioned thirteen segments. The same results are derived from the examination of the larvæ and females of *Drilus* and *Lampyris*. It is true that some of the abdominal segments become more or less confluent in certain insects, particularly of the analogous orders, *Hymenoptera* and *Diptera*. But a little study of their structures will point out the nature of such aberrations, and, I repeat, that the above is the most correct mode of viewing an insect."

We accordingly find, that in all the subsequently published works upon the general principles of Entomology, these views of Messrs. Audouin and Mac Leay have been adopted, but hitherto, with the exception of the papers of Dr. Ratzeburg, to be subsequently noticed, no memoir upon this branch of the science has been published; and yet it is evident that it can only be by a minute and careful examination and comparison of the development of the different segments of the same insect, throughout its various stages, that we can hope to arrive at a decisive confirmation of these views.

It will be seen that Mr. Mac Leay brings forward, as instances of full development, various female insects, the males of which possess a less amply developed abdomen; but in the order of insects, to which I would more particularly request attention, at

* Here the unpractised Entomologist should be put upon his guard against the incorrect ideas which he would gain upon this subject, from the figures given in our two most recent works upon Comparative Anatomy; I allude to Dr. Roget's Bridgewater Treatise, and Dr. Grant's Outlines of Comparative Anatomy, in which a beetle is represented having the nine abdominal segments equally developed.

least in one portion of it, we find the contrary to be the case, the abdomen of the male possessing one more segment than the female, whilst in my memoir upon the Organization of the Earwig, published in these Transactions, I have shown that the male possesses nine fully developed segments, exclusive both of the anus and the caudal forceps, whilst two of these, namely, the penultimate and the antepenultimate, are greatly reduced in size in the female.

Now in the apod larvæ of numerous Hymenopterous insects, which I have lately examined, I have invariably found the body to be composed of fourteen segments, excluding a minute portion often transversely separated from the terminal piece. These segments appear to me to be thus constituted: 1st. A head composed of a single segment, harder and firmer in consistence than the following, being a nearly circular skull, having the mouth composed of the ordinary manducatory pieces at its anterior inferior extremity; then follows a segment destitute both of legs and spiracles, which is succeeded by ten *apod* but spiraculiferous segments, and the body is terminated by two distinct and one (as mentioned before) indistinct segments, destitute of spiracles. The first three of these segments appear to me to constitute the part which will hereafter form the thorax of the imago. This opinion being founded, 1st, upon the structure of the foregoing segment, which comprises all the requisites of the head of a larva: 2dly. Upon the undeniable fact, that in the larva it is not necessary that thoracic segments should be provided with spiracles; those of *Cossus ligniperda* and *Melolontha vulgaris* having the second and third of the thoracic segments destitute of these organs, although they are provided with legs; and thirdly, because we are thereby enabled clearly to trace the analogy between the number of segments of the abdomen of the larva of the *Hymenoptera*, and the fully developed abdomen of the imago of the male *Forficula*. Moreover, as it cannot be doubted that the legs of the larva represent the legs of the imago, so in like manner the head of the larva corresponds with the head of the latter; take, for instance, a pedate Coleopterous larva, and compare it with an apod one—the only difference is the want of legs, the segments being identical; so, likewise, between a pedate Hymenopterous larva, and an apod one.

The paper to which I have above alluded, by Dr. Ratzeburg, is published in the sixteenth volume of the Nova Acta Naturæ Curiosorum, and is illustrated by a series of figures representing the gradual development of the *Formica rufa*, with additional figures of the preparatory stages of *Cynips*, *Ichneumon*, *Diplolepis*, and *Apis*.

The evident insufficiency of some of these figures, is however to be regretted. In the figures of the larvæ of *Formica* and *Apis*, we however find the body represented as composed of fourteen segments, although the position of the spiracles is not noticed. The chief object, however, of Ratzeburg's paper, is to point out the distribution of the segments of the body in the larva, with reference to those of the imago. According to this author, the two first segments become the head of the imago; the third, fourth and fifth, the thorax; the sixth, the peduncle; and the seventh and following, the abdomen. The arguments upon which this view is supported, are founded chiefly upon the examination of the larva of the *Formica*, immediately preceding its assuming the pupa state, at which period it is evident that the external covering of the larva must, from its membranous texture, have conformed to the altered state of the already formed pupa beneath this envelop. Now the head of the pupa and of the imago is larger than that of the larva, consequently it must, at this period of the insect's existence, occupy not only the head of the larva skin, but also a portion of the next segment, hence we gain an idea of the reason which induced Dr. Ratzeburg to account the head of the imago as corresponding with the first two segments of the body of the larva. And I may here observe, upon the incorrect ideas which might be gained upon this part of the subject from the figures of this author, that his fig. 9 *a* represents the first segment of the larva, as occupied by the extremity of the antennæ, but in fig. 12 (being at a subsequent stage) there is nothing in the figure to show, which however is evidently the case, that the first segment of the larva is now entirely empty, the head of the pupa occupying the second segment of the larva.

If therefore we apply the principles, admitted to exist in other groups of insects, to these apod larvæ, we shall find that as the head of the imago is at this period of existence so far pushed out of its place as to occupy the first thoracic segment of the larva, it will necessarily follow that the other true thoracic segments of the imago will also be pushed one segment further backwards, with reference to those of the larva, and hence that the sixth, instead of the fifth segment of the larva, should cover the pedicle of the abdomen of the imago, and consequently (the pedicle being proved, by the gradual modification of form which it undergoes in different groups, to be a portion of the abdomen), that the fifth segment of the larva, as well as the following, should be abdominal.

It may be said that this mode of explanation cannot be correct, because the anterior segments being pushed backwards, it would

follow that the terminal segment of the imago must be in like manner pushed entirely out of the body of the larva; but this is not the case, because in the imago some of the abdominal segments of the larva have disappeared under the reduced form of organs of generation.

I should certainly have hesitated in offering these observations in opposition to the views of Dr. Ratzeburg, were we not enabled thereby to trace out, most satisfactorily, the analogous cases offered in the development of other groups of insects, and had I not, by direct observation, ascertained their insufficiency.

Several years ago, I carefully watched the progress of transformation in the apod larvæ of numerous *Ichneumonidæ*, and noticed that previous to assuming the pupa state, they had changed considerably in form; several of the anterior segments assuming a harder appearance, behind which the body was constricted; the eyes of the future pupa, moreover, appeared through the skin of the hinder part of the second segment. They generally remained thirty-six hours under this form, previous to casting off the skin of the larva. On examining some of these, however, which I placed in spirits, I find that the tips of the antennæ of the pupa extend into the first segment of the larva; that the head of the pupa occupies a portion of the second segment of the larva; that the first, narrow, leg-bearing segment or prothorax of the pupa occupies the remainder of the second and part of the third segment; that the second thoracic segment or mesothorax occupies the remainder of the third and a small portion of the fourth segment; and that the third thoracic segment or metathorax of the pupa occupies the fourth segment of the larva, which is in fact its true analogue.

Our indefatigable member Mr. Shuckard has started an ingenious theory relative to the subject of the present observations, referring to Dr. Ratzeburg's figure of the larva of *Apis mellifica*, which is represented with fourteen segments. He observes, in a note appended to the 35th page of his Translation of Dr. Burmeister's valuable Manual, "Whether this arose from his having figured the larva of the male of that insect, I do not know, for the text does not elucidate it; but the accompanying figure appears to be the pupa of the male, as it has seven segments to the abdomen. I am not aware that it has been before observed, that the larvæ of the males of the aculeate *Hymenoptera* will *necessarily* have an additional segment. Ratzeburg seems to take great merit to himself for having discovered that the larva of the *Hymenoptera* are headless, as he says, and seems to insinuate a censure upon Swammerdam, Reaumur, De Geer, Kirby and

Spence, Latreille, &c. for not having noticed as much. It is evident," he adds, " that these writers considered the two first segments as the head, and *justly*, for although as yet *destitute* of the usual organs, they were in fact the head only requiring further development."

I would however observe, upon Mr. Shuckard's statement that the larvæ of the males of the aculeate *Hymenoptera* will necessarily have an additional segment, that there would be ample grounds for its adoption, if the abdomen of the male bee consisted of ten segments and that of the female of nine; but when we find that the loss of certain segments has actually taken place in both sexes, we cannot by any analogy trace a necessary equal loss in the individuals of opposite sexes. It would be as correct to assert, that the larvæ of the female insects, mentioned by Mr. Mac Leay, necessarily possessed more segments in the larva state than the males. In all the apod larvæ which I have examined, I have constantly found the same number of segments, viz. fourteen.* Moreover, it is well known that sexual peculiarities (and the loss of abdominal segments is one of the most striking) are not developed in the larva state. And lastly, in the larva of the *Ichneumon*, which I have already noticed, there are, as usual, fourteen segments, although it is evident that the insect is a female by the possession of the ovipositor, of which the rudiments are distinctly visible through the skin of the larva.

I will merely add, that Swammerdam evidently considered the first segment alone as the head, the first pair of spiracles being represented as placed upon the third segment of the body; and that the justice of considering the two anterior segments of the larva as forming together the head of the pupa, rests only upon the authority of Dr. Ratzeburg, having by all previous authors been regarded as representing not only the head, but also the first or prothoracic segment of the perfect insect.

* Since this paper was read, I have reared both sexes of a species of *Crabro*, from larvæ precisely agreeing in this number of the segments.

XXIII. *Descriptions of some Species of* Carabidæ, *collected by Charles Darwin, Esq., in his late Voyage. By the Rev.* F. W. Hope, *M. A., F. R. S., &c.*

[Read May 1, 1837.]

Species 1. *Carabus suturalis*, Fab.

Apterus; elytris striatis, viridibus; suturâ aureâ. Long. lin. $8\frac{1}{2}$; lat. lin. $3\frac{1}{4}$.

Habitat in Terrâ del Fuego. In Mus. Dom. Banks et C. Darwin.

Statura *Carabi aurati*. Antennæ fuscæ, basi ferrugineæ. Caput viride, læve, nitens, ore fusco. Thorax cordatus, viridis, margine aureo. Elytra substriata, viridia, striis tribus fere obsoletis punctorum convexorum ferrugineorum; sutura aurea, nitens. Pectus virescens. Abdomen atrum. Pedes ferruginei, plantis nigris.

Obs.—This insect, although described by Fabricius, is apparently unknown on the Continent. It is one of the most beautiful of published species. When captured, it emitted (like all the other species of *Carabus* from Terra del Feugo) a strong ammoniacal odour.

Species 2. *Carabus Valdiviæ*.

Ater; capite thoraceque viridibus; elytris auratis, igne micantibus, marginatis, crenato-sulcatis. Long. lin. 12; lat. lin. $4\frac{1}{4}$.

Habitat in Valdiviâ. In Mus. Dom. Darwin.

Statura *C. Chiloensis*. Antennæ fuscæ; articulis quatuor primis piceis, reliquis pubescentibus. Caput viride; oculis prominentibus, atris. Thorax cordatus, punctulatus, lineâ longitudinali fortiter impressâ marginibusque lateralibus aureis. Scutellum nigrum. Elytra punctato-striata, suturâ nigricanti, in medio disci virescentiâ, marginibus externis auratis, igne micantibus. Corpus subtus piceum.

Obs.—Found in the Cordilleras of Valdivia.

Species 3. *Carabus Chiloensis*, Eschscholtz. *Zool. Atlas.*

Ater; capite thoraceque viridibus; elytris striato-punctatis, aureis et marginatis. Long. lin. 10; lat. lin. $3\frac{1}{2}$.

Habitat in Chiloe. In Museo Dom. Darwin.

Præcedenti affinis at minor. Antennæ quatuor articulis primis piceis, reliquis pubescentibus. Caput viride. Thorax sub-

cordatus, atro-viridis, quasi vermibus erosus, lineâ mediâ longitudinali sub lente parum distinctâ, marginibus elevatis, subviridi-auratis. Elytra striata, punctatissima; suturâ elevatâ nigricanti, apice subabbreviatâ, punctisque oblongis triplici serie elevatis, interstitiis subrugosis. Corpus subtus atrum, pedibus concoloribus.

Species 4. *Carabus insularis.*

Niger; pedibus concoloribus, antennis basi piceis. Long. lin. 10; lat. lin. $3\frac{1}{2}$.

Habitat in Chiloe sub putridis arboribus. In Museo Dom. Darwin.

Statura *Carabi suturalis*, Fab. Fere totum corpus supra nigrum; pedibus concoloribus. Antennæ quatuor primis articulis piceis, reliquis pubescentibus. Caput nigro-viride. Thorax erosus, lateribus elevatis. Elytra striato-punctata, nigra; suturâ elevatâ nitidâ, subtiliter punctulatâ.

Obs.—It is probable that this species may be a variety of the foregoing. In sculpture, however, it differs in many points; both males and females vary in colour. The most characteristic varieties were found in different localities, beneath decayed logs of wood, in the small islet behind Chiloe.

Species 5. *Carabus Darwinii.*

Cyaneus; elytris striatis, thorace elytrisque aureo-marginatis; corpore subtus nigro-cyaneo. Long. lin. 11; lat. lin. $3\frac{3}{4}$.

Habitat in Chiloe. In Museo Dom. Darwin.

Antennæ fuscæ, quatuor primis articulis piceis, reliquis pubescentibus. Caput cyaneo-viride. Thorax punctulatus, longitudinali lineâ fortiter impressâ, lateribus auratis. Elytra punctato-striata, cyanea, punctis obsoletis impressis, triplici serie ordinatis; marginibus auratis, splendidis. Corpus infra nigro-cyaneum; pedibus nigricantibus, tibiis intermediis auricomis.

Obs.—This beautiful insect I have named in honour of my friend Charles Darwin, Esq., a zealous Entomologist. His exertions in advancing the progress of Zoology in general entitle him to the thanks of the scientific world.

Species 6. *Calosoma Patagoniense.*

Cupreo-æneum, nitidum; thorace elytrisque viridi-marginatis;

punctis subelevatis, triplici serie dispositis. Long. lin. $12\frac{1}{2}$; lat. lin. 5.

Habitat in Patagoniâ. In Museo Dom. Darwin.

Antennæ quatuor articulis primis atris, reliquis fusco-pubescentibus. Corpus infra nigrum nitidum, supra bronzeum. Caput inter oculos sparsè punctulatum. Thorax utrinque fortiter impressus, lateribus punctulatis, disco læviori. Elytra elevato-striata, ternis striis parum elevatis, interstitiis viridi-punctatis, punctisque oblongis lævibus. Margo lateralis viridi-æneus. Pedes tibiis intermediis incurvis, reliquis rectis.

Obs.—This insect is evidently allied to *Calosoma laterale*, Kirby: it is however distinct, and is larger than any belonging to this section. The posterior part of the elytra are more dilated than in any other species; the deeply impressed thorax, and the sculpture generally, separate it from any hitherto described species of *Calosoma*. It was captured by Mr. Chas. Darwin, in the northern districts of Patagonia.

Species 7. *Calosoma Galapageium.*

Atrum; antennis basi pedibusque rufo-piceis. Long. lin. 7; lat. lin. 3.

Habitat in insulis Galapageis. In Museo Dom. Darwin.

Atrum, læve, nitidum; elytris substriatis, punctisque elevatis triplici serie dispositis. Antennæ quatuor primis articulis rufo-piceis, reliquis fusco-pubescentibus. Thorax lævis, posticè fossulâ utrinque fortiter impressâ. Elytra obsoletè striata, tribus lineis punctorum elevatorum convexorum; marginibus subviolaceis. Corpus subtus atrum; pedibus rufo-piceis, tibiis intermediis incurvis.

Obs.—Captured in the central part of one of the Islands of the Galapagos Archipelago.

Species 8. *Calosoma Helenæ.*

Atrum; elytrorum margine æneo; antennis basi piceis, pedibusque nigris. Long. lin. 8; lat. lin. $3\frac{1}{2}$.

Habitat in insulâ Sanctæ Helenæ. In Mus. Dom. Darwin.

Atrum; elytris striatis margine æneo, punctisque excavatis triplici serie dispositis. Antennæ quatuor primis articulis piceis, reliquis fusco-pubescentibus. Corpus supra et infra nigrum. Thorax transversè ovatus, marginatus. Elytra striata, subrugosa; marginibus externis subvirescentibus,

punctisque excavatis triplici serie ordinatis. Pedes nigri, tibiis intermediis incurvis.

Obs.—This is one of the smallest species of *Calosoma* which has fallen under my notice: it was captured in the higher and central parts of the Island of St. Helena, by C. Darwin, Esq.

XXIV. *Descriptions of some of the Insects brought to this country by C. Darwin, Esq. By* G. R. Waterhouse, *Esq. Curator to the Zoological Society of London.*

[Read January 2, 1837.]

The species here described belong to the old genus *Haltica* and its subgenera, and are all from Australia.

Species 1. *Haltica crassicornis.*

H. ovata, ænea vel viridis; pedibus, abdominis apice, antennisque ad basin testaceis; capite levitèr punctato; thorace punctulatissimo, foveis longitudinalibus duabus ad basin; elytris punctato-striatis, interstitiis subpunctatis; antennis brevibus, articulis 5 apicalibus nigris, crassioribus.

Long. corp. $1\frac{1}{2}$ lin.

Habitat near Sydney.

Obs.—The antennæ in this species are shorter than is usually observed in insects of this genus: the basal joint is rather long and thick; the second is shorter and thicker than the third: from hence to the apex, the joints gradually increase in width; the last five joints are sensibly incrassated. The antennæ of the females appear to be less thick than those of the males. In form and general appearance this *Haltica* closely resembles some of the species of the genus *Macronema*, but the structure of the antennæ and hinder tibiæ (which are not elongated beyond the base of the tarsus) prevents its being associated with that group. It is about the size of *Macronema Napi*, but of a broader form. I have examined eleven specimens of this species.

Species 2. *H. nitida.*

H. ovata, lata, æneo-viridis; pedibus abdominisque apice testaceis; antennis testaceis, brevibus, articulis 5 apicalibus crassioribus; corpore supra levi; elytris haud striatis.

Long. corp. $1\frac{1}{2}$ lin.

Habitat King George's Sound.

Obs.—This species is evidently allied to the last described, having the same short antennæ, with the terminal joints incrassated; the hinder tibiæ also, as in *H. crassicornis*, are curved downwards. It is remarkable for its short and almost perfectly oval form, and its great glossiness. To the naked eye it appears to be devoid of sculpturing, but with the assistance of a tolerably powerful lens we perceive that the head, thorax and elytra are very delicately punctured.

Species 3. *H. substriata.*

H. longè ovata, testacea; antennis brevibus, capite et thorace impunctatis, hoc foveâ transversâ leviter impresso, prope basin; elytris vix punctato-striatis; femoribus posticis longioribus, corpore subtus piceo.

Long. corp. $1\frac{1}{2}$ lin.

Habitat King George's Sound.

Obs.—This species, like the preceding, would appear at first sight to belong to the genus *Macronema*. The antennæ are moderately thick at the apex.

Species 4. *H. acuminata.*

H. longè ovata, ochracea, corpore supra lævi; elytris versus apicem acuminatis; capite, thorace, suturâque fulvo tinctis; corpore subtus, femoribusque posticis fulvis.

Long. corp. $1\frac{1}{2}$ lin.

Habitat King George's Sound.

Obs.—This species is very closely allied to the preceding: it may, however, be distinguished by the fulvous tint of the body beneath, its different form, and its smooth upper surface, there being no traces of striæ on the elytra; there is a very faint transverse impression on the posterior part of the thorax.

Species 5. *H. bicolor.*

H. ovata, nitidè æneo-viridis; thorace, capite anteriore, antennarumque basi, testaceis; corpore subtus, pedibusque nigris; tibiis tarsisque piceo-testaceis; antennis mediocribus; thorace lineâ transversali, foveisque duabus longitudinalibus, posticè impresso; elytris punctato-striatis.

Long. corp. $1\frac{1}{4}$ lin.

Habitat near Sydney.

Species 6. *H. ovata.*

H. ovata, brevis, lævis, testacea; oculis nigris; corpore subtus, femoribusque posticis fulvis; suturâ nigrescenti; thorace nonnunquam fulvo.

Long. corp. $1\frac{1}{3}$ lin.

Habitat near King George's Sound.

Species 7. *H. variegata.*

H. testaceus, fusco-variegatus; abdomine piceo; thorace brevi, punctulatissimo, sulco transverso foveisque duabus distinctis; elytris punctato-striatis.

Long. corp. 1 lin.

Habitat Van Diemen's Land.

Obs.—From the remarkable colouring of this species, I at first doubted its being a *Haltica*. The three specimens which I have examined vary a little in colour. The head is brown; the thorax is of a chestnut brown hue; the elytra are yellowish, with the suture and outer margin brown: there are likewise two clouded spots at the base, and an interrupted band in the middle, which extends to the outer margin on each side, but not to the suture.

Species 8. *H. labialis.*

H. ovata, testacea, ore nigro, suturâ fuscescente; thorace levitèr punctato; lineâ transversâ foveisque duabus, in parte posteriore; elytris punctato-striatis, interstitiis lævibus.

Long. corp. $\frac{2}{3}$ lin.

Habitat near Sydney.

Obs.—Less than *Haltica nemorum*.

Species 9. *H. picea.*

H. picea; thorace impunctato, in parte posteriore lineâ transversâ profundè impresso, et foveas duas exhibente; elytris punctato-striatis; pedum quatuor anticorum tibiis antennarumque basi, piceo-testaceis.

Long. corp. $\frac{1}{2}$ lin.

Habitat King George's Sound.

Obs.—Less than the last species.

Species 10. *H. bivittata.*

H. sub-ovata, nigra; elytris strigâ flavidâ longitudinali.

Long. corp. $\frac{2}{3}$ lin.

Habitat near King George's Sound.

Obs.—This species very closely resembles *H. nemorum*, but is

of a smaller size and shorter form; the thorax is more thickly punctured, and the antennæ and legs are totally black.

When I first saw this insect, I imagined that it was identical with our turnip fly, and that it had probably been introduced into Australia with turnip seeds, &c.; but upon comparing several specimens, brought over by Mr. Darwin, with our species, I found they invariably differed as above mentioned.

The species next described has but ten joints to the antennæ, and the apex of the posterior tibiæ is prolonged beyond the base of the tarsus: in fact it possesses the characters of the sub-genus *Macronema* (Megerle).

Species 1. (11.) *Macronema scutellata.*

M. cærulea, sub-ovata et lata; thorace elytris angustiori; antennarum articulis tribus basalibus testaceis; corpore subtus nigro; tibiis tarsisque brunneis; scutello æneo; capite impunctato; thorace punctato; elytris punctato-striatis, interstitiis lævibus.

Long. corp. $1\frac{1}{4}$—$1\frac{1}{2}$ lin.

Habitat near Sydney.

Obs.—This species is rather less than the *Macronema napi;* it is of a shorter and broader form, and the thorax is narrower in proportion to the elytra.

The remaining species here described belong to Latreille's sub-genus *Dibolia.* They depart from the more typical *Halticæ* in having the head placed vertically, nearly hidden by the thorax, very broad (generally equal in width to the thorax); the thorax and elytra being nearly of equal width, and of a somewhat cylindrical form; and in having the tibiæ furnished with a tooth-like process in the middle externally. The antennæ are very slender; they somewhat resemble the *Eumolpi.*

Species 1. (12.) *Dibolia ænea.*

D. ænea vel æneo-viridis, subtus nigra; pedibus, palpis antennisque testaceis, femoribus fuscescentibus; capite fere thoracem latitudine æquante, et punctulatissimo; thorace posticè latiori, punctulatissimo; elytris profundè punctato-striatis; interstitiis lævibus.

Long. corp. 1 lin.

Habitat near Sydney.

Obs.—This species is about the size of *Dibolia Cynoglossi.*

Species 2. (13.) *D. æneo-nigra.*

D. æneo-nigra, subtùs nigra; antennis ad basin, tibiis tarsisque testaceo-piceis; capite thoracem latitudine æquante, leviter punctulatissimo; thorace punctato; elytris punctato-striatis, interstitiis lævibus.

Long. corp. 1 lin.

Habitat near King George's Sound.

Obs.—This species is the same size as the last; the head is broader, and its form more nearly approaches to cylindric.

Species 3. (14.) *D. pygmæa.*

D. æneo-viridis; antennis tarsisque testaceis; tibiis fusco-testaceis; capite vix thoracem latitudine æquante, impunctato; thorace punctulatissimo; elytris punctato-striatis.

Long. corp. $\frac{1}{2}$ lin.

Habitat near King George's Sound.

Obs.—This is a very minute species, scarcely more than half the size of *H. nemorum.*

Species 4. (15.) *Dibolia ochracea.*

D. ochracea, suprà æneo-lavata; capite thorace angustiori, hôc punctulatissimo; elytris punctato-striatis.

Long. corp. $\frac{5}{6}$ lin.

Habitat King George's Sound.

Obs.—This species is nearly as large as *D. Cynoglossi:* the æneous tint is indistinct.

Species 5. (16.) *D. subænea.*

D. ochracea, æneo-tincta; capite thoraceque æneo-fuscis, femoribus posticis corporeque subtùs fuscis; capite et thorace punctulatissimis; elytris punctato-striatis, interstitiis subpunctatis.

Long. corp. $1\frac{1}{4}$ lin.

Habitat King George's Sound.

Obs.—This species somewhat resembles the last in colour: it may, however, be easily distinguished from either of the foregoing by its large size. The sculpturing of the upper parts is more delicate than in *D. ochracea.* The head, thorax and elytra are of nearly equal width.

XXV. *Observations on the Habits of the Purple Emperor* (Apatura Iris). *By the late* P. S. Pallas, *M. D.**

[Read December 5th, 1836.]

I found the caterpillar of the purple emperor (*Papilio Iris*, Linnæus,) in the year 1755. It was climbing up the trunk of the willow-tree, from whence it had been disturbed by a storm of wind; full grown as it was, it began, the second day I found it, to prepare for its change, refusing to take any more nourishment. I was very agreeably surprised some time afterwards to see the purple emperor come out of the chrysalis; and the more so, because the changes of this fly had not been recorded by any author I knew, which may be chiefly owing to its scarceness in most places.

I had taken a drawing of the caterpillar and its chrysalis, but I was desirous to see all the changes and to observe the manner of it from its very birth to its state of perfection, as I had done with many others before, having planted, for that purpose, the most common trees of my country in a little garden in pots for the better observing them.

I could not doubt of this caterpillar's feeding upon the leaves of the willow, upon which stem I had found it, since the fly is no where to be found in plenty but about willow plantations, and but seldom about oak-trees. Therefore, to obtain a sufficient number of the eggs of this butterfly, I caught, the following year, as many as I could get, in the willow plantations which cover the highways about Berlin, where, about the middle of June, this fly is annually seen in great numbers, gathering in flocks about the gums that issue out of the stems of willow-trees, which it loves extremely (as also several other flies and the rose-beetles do).

I learned soon to distinguish the sexes of them, which you may do at the first sight, and even whilst they are fluttering in the air, for the female never shows that bright purplish gloss which disguishes the wings of the male at a certain position. I do not find this remark in any of the authors that have mentioned this fly, not even the ingenious Rösel. Mr. Ray describes only the female. Rösel and Wilkes have figured only the male.

There are two varieties of both sexes, one with white, the other

* These observations were communicated to Mr. Baker, F. R. S., and by him presented to the Aurelian Society. They remained however unpublished, and came into my hands with other entomological manuscripts of the late Mr. Drury. —J. O. W.

with yellow-spotted wings, and I never found them promiscuously coupled together; but always a yellow-spotted male coupling with a yellow-spotted female, &c., which, by the bye, generally is in the evening; this is the property of many butterflies (with the fore-feet imperfect) to couple in the evening. For though you see them playing together in the air all day long, they never couple till the approach of night and rest gives them leisure. They cohere great part of the night, and I have often found them coupled still in the morning. This hath made Mr. Rösel believe that this family of butterflies which fly in the day, couple only in flying over one another, as some sort of doves used to do.

The way by which I used to get the eggs of these flies (which every one who has taken some pains in observing insects well knows to be very difficult) was to include them in a narrow dark vessel, with some leaves or branches of the plant I could probably guess to be the food of these caterpillars, without giving much air to the vessel, and, if the flies were too brisk, cutting their wings. In this way, I never failed to obtain eggs from any sort of flies, if there were any impregnated females among my prisoners. The purple emperor scatters its eggs, which are of a curious and elegant shape, up and down the leaves of the highest branches of the willow and oak, as I afterwards observed. They are always fixed with their flat bottom to the leaf, not that they acquire this figure by the flat surface they lie upon, for they are hardened before the fly discharges them, but as the eggs of many other flies and moths, being formed so in the womb, and fixed in this manner by the parent. The eggs of the purple emperor, while they are in the womb, are of a dark green colour, which they never change, being taken out unfecundated; but when laid by an impregnated female, they have a bright greenish yellow cast, and, in short, acquire a black or rather dark brown circle around the top, which is the place where afterwards the head of the caterpillar is formed and seen through the transparent shell. This is also the circle which the caterpillar, in forcing its passage, breaks, lifting up the top of the egg like a trap-door.

The caterpillar, when it is first hatched, is of the same yellow colour with the egg, and in a very lean state in proportion to its dark brown head, which is roundish, and of the usual shape observable in most caterpillars. Its first food is the empty whitish and transparent egg-shell, which some consume to the very bottom. But as soon as it is put upon a young leaf of the sallow willow, it climbs to the tip of it along the upper side of the rib, spinning all along the way, (though I could not imagine how so

lean a body could afford silk sufficient to line its way); when it comes to the extremity of the leaf, it begins to gnaw the edge of the leaf at a little distance from the top; after the repast it retires to the very tip of the leaf, where it resides upon the rib on the upper side, with the head directed towards the stem of the leaf, resting itself with the fore-claws loosened and applied close to the body. This fashion the creature observes all the following time of its life. It gnaws the leaf on both sides to the bare rib, leaving the tip untouched, which it covers with a thick white web, to fix its claws in when it rests. When a leaf is consumed, it resorts to the next downwards. It feeds covering all its way with silk, and by these means, tying the leaf, which it takes possession of, to the branch.

The yellow colour which they have when first hatched soon changes, as it seems by an effect of their food, to a pleasing green, a little whitish on the underside, and with the same roughness of skin and yellowish oblique lines on the back, which are observed in the full grown ones.

When the period of slitting off their first skin approaches, the first joint of the body swells behind the head to a considerable, yet low, tumour; they disengage themselves by casting off the old scull, and slipping off the skin like a serpent; and now there appears a head quite different in shape to what it had before, and such as we observe in the full-grown caterpillars. The horns on both sides round the body are a semicircular form, and occasion the forementioned tumours. As soon as the head is freed from the old skin, the horns begin to stretch and to rise to an erected situation, and, from short appendages, grow to slender and long horns, forked at the tip in the same manner as we see the wings of a butterfly. In some minutes the head has acquired its colour and solidity, and the new-born caterpillar turns itself to devour its cast-off skin, after which it returns to its usual food.

The second casting of the skin is attended with the same circumstances; the horns of the new scull are convolved in the very same manner, and stretched, after being disengaged. At the second renovation the figure of the horns is different from what it had been before; they are shorter and not forked at the extremity.

By this time the season grows cold, and the willow begins to lose its leaves, but those that were occupied by these little insects had their stalks thus fortified and tied with silk that they could not fall, but shrivelled up and dried. My little caterpillars, thus destitute of food, disposed themselves here and there on the underside of the branches, where they covered a little space with a carpet

of silk to fix their claws in ; they grew torpid, and changed their bright green colour, first to a very dark, afterwards to a dusty, and at last a yellowish brown colour, pale on the underside, and in this state seldom were seen to stir, except in mild weather.

I do not know whether it was the dryness and closeness of the place, where my willow-tree was kept in a pot, which was a summer-house without windows, or what other circumstance, that occasioned the loss of the brood, but they grew evidently leaner and weaker, and dried upon their places before the spring could refresh them. As I went soon after on my travels, I had no opportunity of making a second trial to bring others up. But I believe the rest of their history may be safely supplied by supposing that they do not change their behaviour, and that they slip off their skin twice more as most caterpillars do.

This I must mention however, that my caterpillars, after changing their skin a second time, seemed too small to me to equal the bulk of the full-grown one I had seen before, by twice casting their skins. But this might be also the consequence of the dryness of the place they were kept in, and where they were deprived of the morning dew, which I endeavoured to supply by sprinkling water over them with a brush. I am the more apt to believe this because several other sorts of caterpillars brought up under the same consequences [circumstances] came but to a very inconsiderable size, and afforded me the smallest moths of the kind I ever saw.

There is another property of the purple emperor caterpillars which it will seem ridiculous to mention, but as I often and constantly saw them do it, I would not neglect relating any of the singularities of this insect. The excremental masses of these little animals seem to be of so tenaceous a substance, that they do not fall off as soon as they are excreted. Therefore, at every excretion the caterpillar, bending its body, takes the excrement with its foremost feet, and then, lifting it as high as possible, causes it to fall beyond the tip of the leaf.

These are all the remarks I made upon the caterpillar of the purple emperor, which has given me no small diversion in my leisure hours, which I applied wholly to the observing various insects. The drawings which I made of the several changes I have not now at hand, but some of the dried eggs and caterpillars I lately found among a few insects, which I thought worth taking along with me when I left Berlin, and which I left with some curious in Holland.

You will be so kind as to excuse the faults of this account as set up by a foreigner little skilled in the use of the language, and who endeavoured to make it as intelligible as he could.

XXVI. *Synopsis of the Species belonging to the Genus* Castnia. *By* George Robert Gray, *Esq. M.E.S.*

[Read February 2, 1835.]
(Plate XIII.)

Although two monographs of the Fabrician genus *Castnia* have appeared, I am induced to draw up the following synopsis of species to obviate the great confusion that exists between them, as the same species of insect has often been described under two distinct names by the respective authors.

The monograph by Dalman (1825) contains eighteen species, two of which are new, and two species (published by Cramer) not noticed by Godart and Latreille, whose monograph appeared in the ninth volume of the "Encyclopédie Méthodique" (1819). The latter is also composed of eighteen species, but five of them were new to science, and two of the species, previously published, were not noticed by Dalman. To these I have added all the newly described species from various works, and have subjoined several new species, which are in the superb Lepidopterous collection of Mrs. Children.

The insects of this genus are particularly "confined to the tropical region of America." Mr. Swainson tells us, "that they fly only during the meridian heat, and then with incredible rapidity: they frequent the inlets of the thick forests, occasionally resting, far above the ground, on the trunks of trees."

Their metamorphoses unfortunately are at present enveloped in doubt, though Madam Merian has given what she considered figures of the larva and chrysalis of *Castnia licus*. The larva bears great similarity to that of *Sphinx vespertilio*, while the chrysalis is represented, fixed by its tail, in the manner of those of *Morpho* and other diurnal butterflies.

The *antennæ* of these insects are shorter than the body; strongly clubbed near the apex, with the latter somewhat hooked, which is sometimes formed by a series of long narrow scales, giving them much the appearance of the antennæ of *Hesperiæ*.

The *palpi* in some are long, in others reaching half way towards the base of the antennæ; the first joint is always short and thick; the second always the longest, and of equal thickness throughout; the third is always very short, with the apex mucronate. These joints are more or less covered with scales.

The *head* is broad, sometimes broader in the male than in the female, with large and prominent eyes: it is also furnished with three distinct ocelli.

The *body* is large, somewhat pointed, thickly covered with prominent scales, and generally ending with a brush of longer ones.

The *wings* vary in form and also in the disposition of the nervures; the discoidal cell of the lower wing appears to be open, except that a very slender nervure proceeds a short distance from the base, and diverges to each side, forming two small cells, whilst in *Castnia Nicon* the discoidal cell is open, but a slender nervure proceeds from the base, and is attached only to one side, and thus forming a cell. These insects, like all others which deflex their wings when in a state of repose, are furnished with wing-guide or guides, for they vary in number as to species. They proceed from the main nerve of the lower wing, and are received into a socket placed on the upper nerve of the discoidal cell of the anterior pair. The socket is covered with scales, so as to be scarcely visible.

The species of this genus may be divided into the following sections:—

I. Those with the palpi very long, closely applied to the head, and covered with short scales. The fore-wings are subtriangular, thickly clothed with scales, with the exterior margin straight, or slightly rounded; the lower wing beneath with one guide.—*C. Cyparissias*, *Licus*, *Evalthe*, *Fonscolombei*, pl. xiii, fig. 1, &c.

II. Those with the fore-wings elongate-triangular; the hind-wings are expanded, with the posterior margin somewhat truncate.—*C. Ardalus*, *Palatinus*.

III. Those with the palpi short, reaching half way towards the base of the antennæ, and covered with long scales; the fore-wings covered with small scales, with the exterior margin rounded. The outer margin of all prominently fringed with long scales.—*C. Hubneri*, pl. xiii. fig. 2.

IV. Those with the wings covered with minute scales, partly diaphanous; the fore-pair with the exterior margin rounded, similar also in the hind-pair, with three wing-guides.—*C. Cochrus*, *Linus*, and *Acræoides*.

V. Those with the antennæ similar to the others, but the

hook at the apex is formed of large scales. The head of the male is very broad, as the eyes are much larger than in the female. All the wings have the outer margin rounded with a narrow fringe of small scales, and with four wing-guides. The sexes differ much in colour.—*C. Nicon*, pl. xiii. fig. 3.—*Thais*.

Species 1. *C. Cyparissias*, Latr. et Godart.

Alis atris, nitidis, fasciis duabus albis, anticarum repandis, posticarum macularibus. Al. exp. 7″—7″, 6‴.

Pap. Dædalus, Cram. f. 1, f. A. B.

Pap. Cyparissias, Fabr. Ent. Syst. iii. p. 39, no. 415; Herbst. f. 118, f. 1, 2; Shaw's Misc. pl. 574.

Le P. Dædalus, Ency. Méth. Ins. pl. 12, f. 1.

Castnia Dædalus, Dalm. Mong. Cast. p. 7.

Castnia Cyparissias, Latr. et Godart. Ency. Méth. ix. 797.

Eupalamides Dædalus, Hubn. Cat. 1068.

Habitat in Surinamo.

Species 2. *C. Latreillei*, Godart.

Alis anticis fusco-olivaceis, maculis obscurioribus fasciâque obliquâ sordidè albâ; posticis nigris, punctis intra-marginalibus cærulescentibus. Al. exp. 5″ 3‴.

Castnia Latreillei, Godart. Ency. Méth. ix.; Spix, An. Art. pl. 30, f. 7.

Castnia Actor, Dalm. Mong. Cast. 8, pl. 1, f. 1.

Eupalamides Ctesiphon, Hubn. Sc. Ex. 11, pl.

Habitat in Brasiliâ.

Species 3. *C. Atymnus*, Dalm.

Alis nigris, fasciâ obliquâ albâ, anticarum angustâ, posticarum dilatatâ, margine immaculatis; antennarum apice, abdomine, corporeque subtus albidis. Al. exp. 4″.

Castnia Atymnus, Dalm. Monog. Cast. 12.

Castnia Spixii, Perty. Spix. An. Art. pl. 30, f. 2.

Habitat in Brasiliâ. In Coll. Dominæ Childrenæ.

Species 4. *C. Pylades*, Latr. et Godart.

Alis atris, nitidis; anticis fasciis duabus repandis, supra albidis, subtus rufescentibus; posticis fasciâ marginali utrinque fulvo nigroque maculatâ. Al. exp. 5″ 6‴.

Pap. Pylades, Cram. f. 387, f. A. B.; Herbs. f. 135, f. 1, 2; Shaw's Misc. pl. 895. (nec *Pap. Pylades*, Fabr.)

Le P. Pylade, Ency. Méth. Ins. pl. 12, f. 2.

Castnia Pylades, Latr. et Godart, Ency. Méth. ix. 797; Dalm. Mong. Cast. p. 9.

Corybantes Pylades, Hubn. Cat. 1066.

Habitat in (India, Cr.)

Species 5. *C. Licus*, Latr. et Godart.

Alis atris, nitidis; anticis sesquifasciâ albâ; posticis unicâ repandâ albâ, serie marginali e maculis rubris; posticarum paginâ inferiori cinereâ. Al. exp. 4″.

Pap. Licus, Cram. f. 223, f. A. B.; Fabr. Ent. Syst. iii. p. 45, no. 137; Herbst. Ins. f. 134, f. 3, 4; Drury's Ins. i. pl. 16, f. 1, 2; Merian's Sur. Ins. f. 36.

Le P. Licus, Ency. Méth. Ins. f. 12, f. 4.

Castnia Licus, Latr. et Godart. Ency. Méth. ix. 797; Dalm. Monog. Cast.

Corybantes Licus, Hubn. Cat. 1064; Hubn. Sch. Ex. 1, pl.

Habitat in Demerara. In coll. D. Childrenæ. Mus. Brit.

Species 6. *C. Harmodius*, Dalm.

Alis nigris; anticis fasciâ obliquâ strigâque interruptâ, supra flavis, subtus albis; posticis fasciâ intramarginali ferrugineâ ante angulum analem subinterruptâ. Al. exp. 4″.

Pap. Harmodius, Cram. f. 223, f. C. D.

Pap. Syphax, Fabr. Ent. Syst. iii. p. 45, no. 135, Gm.; Herbst. Ins. f. 134, f. 1, 2.

Le P. Pirrha, Ency. Méth. Ins. pl. 16, f. 2.

Castnia Harmodius, Dalm. Monog. Cast. 11.

Castnia Licus, *var.* Latr. et Godart. Ency. Méth. ix.

Corybantes Syphax, Hubn. Cat. 1065.

Habitat in Surinamo. In coll. Mus. Brit.

Species 7. *C. Evalthe*, Latr. et Godart.

Alis nigris, nitidis; anticis fasciis duâbus, posticis unicâ, flavis; posticis supra serie e maculis marginalibus, subtus paginâ omni, rubris. Al. exp. 3″.

Pap. Dardanus, Cram. f. 17, f. E. F.

Pap. Evalthe, Fabr. Ent. Syst. iii. p. 45, no. 136; Herbst. Ins. f. 137, f. 1, 2; Donov. Ins. of India, pl. 22.

Castnia Evalthe, Latr. et Godart. Ency. Meth. ix. 798; Dalm. Monog. Cast. 13.

Corybantes Dardanus, Hubn. Cat. 1062.

Habitat in Surinamo, Brasiliâ. In coll. Mus. Brit.

Species 8. *C. Euphrosyne*, Perty.

Alis fusco-nigris, nitidis, anticis sesquifasciâ, posticis maculâ magnâ, flavis; his macularum aurantiacarum serie ad marginem posticum. (Perty.) Al. exp. 2″ 8‴.

Castnia Euphrosyne, Perty. Spix. An. Art. pl. 30, f. 1.

Habitat in Brasiliâ.

Species 9. *C. Icarus*, Latr. et Godart.

Alis fuscis, nitidis, fasciis tribus albis; posticis rubris, strigis duâbus undulatis limboque nigris. Al. exp. 3½″—4″.

Pap. Icarus, Cram. f. 18, f. A. B.; Shaw's Misc. pl. 692.

Le P. Icare, Ency. Méth. Ins. pl. 12, f. 3.

Castnia Icarus, Latr. et Godart, Ency. Méth. ix. 798; Dalm. Monog. Castn. 10.

Corybantes Icarus, Hubn. Cat. 1063; Hubn. Sc. Ex. 1, pl.

Habitat in Surinamo.

Species 10. *C. Fabricii*, Swains.

♀. "Alis anticis ferrugineis, fasciâ obscurâ sinuosâ, et maculâ discoidali; posticis pallidè testaceis, fasciis tribus interruptis crenatis nigris, serie e maculis juxta marginem ovatis, nigris." (Swains.) Al. exp. 5″ 3‴.

Castnia Fabricii, Swains. Zool. Ill. iii. f. 149; (nec Latr. et Godart. Ency. Méth.); Thon's Ent. Arch. 1829, 123 *b*.

Red wing day moth, Sw.

Habitat in Brasiliâ. (Diamond District.)

Species 11. *C. Zerynthia*, G. R. Gray.

Alis anticis fusco-olivaceis, nitidis, fasciâ bifidâ sordidè albâ, apice punctis albo-hyalinis; posticis nigris, basi fusco-olivaceis, fasciâ mediâ latâ albâ, margine nigro, strigâ maculisque flavis. Al. exp. ♂ 4″ 6‴. ♀ 6″.

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 12. *C. Fonscolombei*, Latr. et Godart.

Alis anticis supra ferrugineis, nitidis; *feminæ* disco punctis quinque hyalino-flavescentibus; posticis flavo-testaceis, serie postica e maculis nigris. Al. exp. 4½″.

Castnia Fonscolombe, Latr. et Godart, Ency. Méth. ix. 799.

Athis Jäpyx, Hubn. Sc. Ex. 11, pl.

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 13. *C. Dalmannii,* G. R. Gray.

Alis anticis ferrugineis, *maris* fasciis duabus obsoletis; *feminæ* olivaceis fasciâ albâ angustâ, et punctis hyalinis duobus; posticis rubris, basi, strigis maculisque juxta marginem, nigris; *maris* disco flavo, et *feminæ* albo.

Al. exp. ♂ $3\frac{1}{2}''$. ♀ 4″.

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 14. *C. Eudesmia,* G. R. Gray.

Alis griseo-fuscis, fimbriâ albâ; anticis fasciis obliquis duâbus albis; posticis nigris, cæruleo-nitidis, basi fasciisque macularibus duabus rubris, maculis pupillis albis, margine posteriore griseo-fusco. Al. exp. 4″ 7‴.

Habitat in Chili. In coll. D. Childrenæ.

Species 15. *C. Amycus,* Latr. et Godart.

Alis nigris, nitidis; anticis utrinque fasciâ punctoque albis; posticis supra fasciis duâbus, subtus paginâ omni rubris. Al. exp. 2″.

Pap. Amycus, Cram. f. 227, f. D. E.

Castnia Amycus, Latr. et Godart, Ency. Méth. ix. 798; Dalm. Monog. Cast. 19.

Corybantes Amycus, Hubn. Cat. 1061.

Habitat in Surinamo, Brasiliâ. In coll. D. Childrenæ.

Species 16. *C. Mygdon,* Dalm.

Alis fuscis, anticis fasciis obscurioribus et pallidioribus indeterminatis; posticis fasciis duabus intramarginalibus e maculis, *maris* albis, *feminæ* luteis. Al. exp. 3″.

Castnia Mygdon, Dalm. Monog. Castn. 20, pl. 1, f. 4.

Castnia Phaleris, Latr. & Godart. Ency. Méth. ix. 799, (nec Fabricius.)

Synpalamides Mimon, Hubn. Sc. Ex. 11, pl.

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 17. *C. Phalaris,* Dalm.

Alis fuscis, immaculatis; posticis strigis duabus macularibus albis. Al. exp.—.

Pap. Phalaris, Fabr. Ent. Syst. iii. i. 45, no. 138.

Castnia Phalaris, Dalm. Monog. Castn. 22; Donov. Nat. Misc. 2. 47. 1.

Habitat (ignotus).

Species 18. *C. decussata*, Latr. et Godart.

Alis fusco-viridibus, nitidis; anticis fasciis duâbus albis decussatis; posticis unicâ maculari. Al. exp. $2\frac{1}{2}''$.

Castnia decussata, Latr. et Godart. Ency. Méth. ix. 799; Hubn. Sc. Ex. iii. pl., f. 639, 640.

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 19. *C. Hubneri*, Boisd.

Alis anticis brunneis, fasciis macularibus duâbus albis; posticis nigrescentibus basi rufescentibus, fasciâ maculari mediâ albidâ, alterâ juxta marginem. Al. exp. 2″.

Castnia Hubneri, Boisd. Cuv. Reg. An. iii. 439, pl. 20, f. 2.

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 20. *C. Pelasgus*, Latr. et Godart.

Alis atris; anticis virescentibus fasciâ fulvâ; posticis nigris, immaculatis. Al. exp. 2″ 6‴.

Pap. Pelasgus, Fabr. Ent. Syst. iii. p. 46, no. 139; Cram. Ins. f. 202, f. D; Herbst. Ins. f. 136, f. 6.

Le P. Pelascus, Ency. Méth. Ins. pl. 12, f. 5.

Castnia Pelasgus, Latr. et Godart, Ency. Méth. ix. 801; Dalm. Monog. Castn. 21.

Castnius Pelasgus, Hubn. Cat. 1076.

Habitat in Surinamo.

Species 21. *C. Cronis*, Latr. et Godart.

Alis concoloribus, anticis nigris plagâ discoidali maculisque marginalibus albis; posticis abdomineque flavis; thorace nigro, puncto humerali sanguineo. Al. exp. 3″.

Pap. Cronis, Cram. Ins. f. 178, A.

Castnia Cronis, Latr. et Godart, Ency. Méth. ix. 801; Dalm. Monog. Castn. 23.

Hæmonides Cronis, Hubn. Cat. 1069.

Habitat in Surinamo. In coll. D. Loddiges.

Obs.—Mr. Bowerbank has kindly shown me the specimen taken in Messrs. Loddiges's nursery, which I consider a female. It differs from Cramer's figure, in the base, spots on the thorax and marks on the head being white. Beneath the hinder wings, the inner and marginal bands are black; these bands are connected by means of narrow bands running along the nervures, thus forming cells somewhat like those on the upper surface. The expanse of wings is $3\frac{1}{2}$ inches from tip to tip.

Species 22. *C. Ardalus*, Dalm.

Alis anticis olivaceo-fuscis, fasciâ obliquâ sinuosâ maculâque griseis; posticis nigris, fasciâ mediâ punctisque intramarginalibus albis, fasciâque intermediâ rubrâ maculari.

Al. exp. 3″.

Castnia Ardalus, Dalm. Monog. Castn. 17.

Castnia Pallasia, Esch. in Kotz. Iter. iii. 27, pl. vi. f. 27 ?

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 23. *C. Brecourtii*, Latr. et Godart.

Alis atris, nitidis; anticis fasciâ difformi albidâ; posticis fasciis duabus transversis albis intermediâque miniaceâ.

Al. exp. 3″.

Castnia Brecourt, Latr. et Godart. Ency. Méth. ix. 798.

Habitat in Brasiliâ.

Probably the same as the preceding.

Species 24. *C. Palatinus*, Latr. et Godart.

Alis anticis ferrugineis, nitidis, puncto ocellari nigro; posticis nigris, fasciâ mediâ strigâque apice maculari albido-flavescentibus. Al. exp. 3″ 6‴.

Pap. Palatinus, Cram. Ins. f. 159, B. C.

Castnia Palatinus, Latr. et Godart, Ency. Méth. ix. 799; Dalm. Monog. Castn. 18.

Athis Palatinus, Hubn. Cat. 1067.

Habitat in Surinamo et Demerara. In coll. D. Childrenæ.

Species 25. *C. Cochrus*, Latr. et Godart.

Alis concoloribus atris, nitidis, omnium disco fasciâ abbreviatâ albâ, abdomine posticè cingulis sanguineis albo-marginatis.

Al. exp. 4′ 6‴.

Pap. Cochrus, Fabr. Ent. Syst. iii. p. 42, no. 125; Donov. Nat. Repos. v. pl. 150.

Castnia Maris, Dalm. Monog. Castn. 16.

Castnia Cochrus, Latr. et Godart. Ency. Méth. ix. 798.

Prometheus Casmilus, Hubn. Sc. Ex. ii. pl.

Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 26. *C. Linus*, Dalm.

Alis concoloribus nigris, maculis flavo-hyalinis, corpore subtus albo, supra nigro, abdominis basi et antennarum apice, flavis.

Al. exp. 3″ 3‴.

Pap. Linus, Cram. Ins. f. 257, A; Herbst. Ins. f. 78, f. 4.
Castnia Linus, Dalm. Monog. Castn. 24.
Cabirus Linus, Hubn. Cat. 1072.
Habitat in Surinamo et Brasiliâ. In coll. D. Childrenæ.

Species 27. *C. Acræoïdes*, Boisd.

Alis anticis nigrofuscis, strigis inter nervos nigris, basi et disco obscurè flavis; posticis rubris, nervis margineque nigris, ultimo maculis parvis albis. Al. exp. 2″ 6‴.

Castnia Acræoïdes, Boisduval in Guer. Icon. pl. 83, f. 4; Griff. An. Kingd. pl. 53, f. 4; Boisd. Hist. Nat. des Ins. p. Lepid. Planch. pl. 14, f. 1.
Habitat in Brasiliâ. In coll. D. Childrenæ.

Species 28. *C. Nicon*, G. R. Gray.

♂ Alis anticis brunneis violescenti-nitidis, fasciis duâbus subferrugineis; posticis nigris violescenti et cærulescenti-nitidis, apicibus maculis fasciâque aureo-testaceis. Al. exp. 3″ 5‴.

♀ Alis anticis carneo-grisescentibus viridi-nitidis, fasciis duâbus ferrugineis; posticis testaceis, fasciis duâbus margineque crenato nigris; subtus fasciâ in medio maculari transversâ obscurâ, ocellis albis. Al. exp. 3″ 3‴.

♂. ♀. *Corybantes Nicon*, Hubn. Sc. Ex. 11, pl.
♀. *Castnia Thalaria*, Latr. et Godart. Ency. Méth. ix. 800, (nec *Thais*, Drury.)
Habitat in Brasiliâ. In coll. D. Childrenæ.

Obs.—The number of ocellated spots of the under surface of the hinder wings vary in specimens from two or more. In some, however, they are entirely wanted.

Species 29. *C. Marcel Serresi*, Latr. et Godart.

♂. alis fuscis, nitidis, fasciis obsoletis carneo-grisescentibus, anticarum tribus continuis, posticarum duâbus macularibus. Al. exp. 2″ 3‴.

♀ alis carneo-grisescentibus fasciis obsoletis; posticis testaceis, fasciis duâbus margineque crenato nigris; subtus pallidioribus, fasciis macularibus duâbus obscuris, maculâ in medio albâ. Al. exp. 2″ 9‴.

♂. *Castnia Marcel Serres*, Latr. et Godart. Ency. Méth. ix. 800; Hubn. Sc. Ex. iii. pl. f. 711, 712.
♀. *Pap. Thais*, Drury's Ins. iii. f. 16, f. 4.

Castnia Fabricii, Latr. et Godart, Ency. Méth. ix. 800; (nec Swainson, Illustr.)

Habitat in Brasiliâ. In coll. D. Childrenæ.

Obs.—To this genus was added, by Dalman, the *Pap. Erycinia*, Cr. pl. 177, f. 9, but with doubt as to its being properly placed. Godart refers it to the genus *Pieris;* he is followed in the same idea by Boisduval: I have therefore adopted the notions of the two last-named authors, and have not included it.

There is also a species of this genus described in Thon's Archiv., vol. ii., under the name of *C. Kirstenii*, the description of which I am unable to add, as I have not met with the above work.

XXVII. *Notice sur le Male de l'*Epomidiopteron Julii. *Par* M. de Romand, *(de Tours, Chev. de Leg. d'Honneur, &c.)*

[Read 4th September, 1837.]

Je dois à Mr. Shuckard, un des membres distingués de votre honorable Société, d'avoir été mis sur la voie de l'insecte hyménoptère que je vais avoir l'honneur de vous soumettre, et qui existe au British Museum. Cet insecte me paroit le ♂ de celui dont j'ai fait la description dans les *Annales de la Société Entomologique de France,* (1835, p. 653,) sous la denomination d'*Epomidiopteron Julii.* Ce rapprochement me fait désirer d'en donner communication, et je prend la liberté de le présenter aux Transactions de votre Société, comme un de ses sujets.

Le caractère principal, qui m'a déterminé à établir ce genre, se retrouve entièrement dans l'insecte dont je joins le dessin. Je veux dire, une écaille longue et large qui recouvre, de chaque côté, l'insertion des deux ailes. Le port et l'ensemble de l'insecte le rendent identique avec l'*Epomidiopteron Julii*, sauf les différences que le sexe exige.

Le corselet et l'abdomen du ♂ sont conformés comme ceux de la ♀, et sont à peu près ornés des mêmes taches blanches, avec cette différence, que les 2 taches intermédiaires, qui existent sur l'abdomen de la ♀, sont plus grandes; et que ces taches sont au

nombre de 4 sur l'abdomen du ♂, lorsqu'il y en a 6 sur celui de la ♀. La conformation des pattes antérieures est absolument pareille dans les deux insectes, et chaque jambe est également armée, vers les $\frac{2}{3}$ de sa partie intérieure, d'un onglet recourbé, long et pointu. Les ongles, qui terminent les tarses des pattes postérieures, sont aussi bidentés, et ont la même conformation.

Le système alaire offre des différences qui se remarquent généralement dans les insectes hyménoptères de cette famille, et distinguent très souvent le sexe. Ainsi dans la ♀, la nervure de la cellule radiale est si peu marquée à son extrémité, quelle semble une trace légère, lorsque dans le ♂ cette même nervure n'a pas la même défectuosité. D'un autre côté, dans le ♂, la nervure qui sépare la 2e cellule cubitale de la 1ere, est à peine commencée, et la 2e cellule discoidale (suivant Mr. Shuckard, dont je cite avec une grande satisfaction le travail sur le système alaire) se termine dans la ♀ par une nervure appendiculée, qui ne continue pas.

L'insecte est tout noir, le corselet et l'abdomen sont ornés de taches blanc de lait, et pointillés très finement. Ailes noir-bleues, avec des teintes orangées.

DESCRIPTION OF PLATE XIV.

Fig. 1. Insecte de grandeur n^{elle}. 2. Tête grossie. 3. Corselet grossi. 3 *a*, Ecaille large et longue, recouvrant les 2 ailes. 4. Aile grossie. 5. Antenne grossie. 6. Patte antérieure grossie. 6. Onglet recourbé. 7. Patte postérieure grossie. 8. Deux derniers articles des tarses terminés par deux onglets bidentés.

XXVIII. *Description of a new Genus of Dipterous Insects from New South Wales.* *By* J. O. Westwood, *F. L. S.*

[Read February 1, 1836.]

Trichopsidea, Westw.

Genus novum e familia *Anthracidarum*, *Nemestrinas* cum *Colace* Wiedemanni conjungens.

Corpus parvum, hirsutum.

Caput transversum, oculis magnis lateralibus in uno sexu in verticem conjunctis, spatio parvo elevato, pro ocellis, posticè relicto; fronte triangulari, valdè piloso, pilis proboscidem omnino tegentibus. *Ocelli* 3 parvi in triangulum dispositi. *Antennæ* minutæ distantes, faciei medio ad marginem internum oculorum insertæ; 3-articulatæ; articulo 1mo brevi, cylindrico; 2do parvo, globoso; 3tio pyriformi in setam versus apicem paullo crassiorem producto.

Os rudimentale, labro elongato-conico, corneo; labio paullo longiori, apice ovato, concavo; palpis? e filamentis duobus elongatis membranaceis, constantibus.

Thorax subquadratus, valdè pilosus; scutello transverso, inermi.

Abdomen ovatum, convexum.

Pedes graciles, tarsorum articulo 1mo longiori; 2do, 3tio, et 4to minutis, pulvillis tribus.

Alæ corporis toti longitudine, patentes, nervis fere ut in *Nemestrina fasciata* dispositis; nervo 3tio apicali simplici, 4to intus furcato.

This is a curious genus, having in several respects a considerable external resemblance to the *Œstridæ*, a circumstance more especially observable in the covering of hair with which the face is entirely covered, concealing the rudimental mouth, which is furnished laterally with two long membranous fillets like strips of parchment, which I presume are analogous to palpi. There is also a horny upper lip, and a dark coloured body, which I presume is the analogue of the terminal lobes of the proboscis.

It is distinct from all the sub-genera of *Nemestrina* lately proposed by me in the *London and Edinburgh Philosophical Magazine*, in which the elongated proboscis is distinct. The neuration of the wings is also more simple.

From Wiedemann's genus *Colax* it is distinct in the possession of ocelli, rudimental mouth, and nervures of the wing. I agree, however, with Latrielle in thinking, that notwithstanding the absence of a proboscis, the last-mentioned genus is referable to the *Anthracidæ* rather than the *Œstridæ;* the nerves of its wings being evidently disposed upon the same type as in *Nemestrina.*

I am acquainted with but one species of this new genus.

Trichopsidea œstracea, Westw.

Obscurè nigra; thorace, facie, marginibusque segmentorum abdominalium fulvo-pilosis; pedibus rufescentibus, femoribus ad basin obscuris; alis hyalinis, costâ obscuriori nervisque costalibus crassioribus.

Long. corp. lin. 4½. Expans. alarum lin. 10.

Habitat in Nova Hollandia. In Musæo nostro.

Tab. XIV. fig. 9. Trichopsidea œstracea, and details. 9 *a*. Front of head. 9 *b*. Head sideways. 9 *c*. Antenna. 9 *d*. Trophi. 9 *e*. Wing. 9 *f*. Hind leg.

XXIX. *Notice of a Case in which the Larvæ of a Dipterous Insect, supposed to be the* Anthomyia Canicularis, *Meig., were expelled in large quantities from the human intestines; accompanied by a Description of the same. By the* Rev. Leonard Jenyns, *M.A., F.L.S., &c.*

[Read 5th June, 1837.]

I am indebted to Dr. Haviland, of Cambridge, for the knowledge of a case which occurred lately in his practice as a physician in the neighbourhood of that town, in which large quantities of the larvæ of some insect were expelled from the human intestines. Conceiving that the circumstance may afford interest to the members of the Entomological Society, as also that it is of importance to science to record every authentic case of this nature, I have obtained the following particulars, which, together with a description of the larvæ in question, I beg leave to bring under their attention.

The patient was a clergyman, about seventy years of age. The symptoms of which he complained previously to the first appearance of the above larvæ were—general weakness, loss of appetite, and a disagreeable sensation about the epigastrium, which he described as a tremulous motion. These symptoms commenced in

the spring of 1836, and it was not till the summer and autumn of that year that the larvæ were observed in the motions. They then passed off in very large quantities on different occasions, the discharge continuing at intervals for several months. According to the patient's own statement, the chamber-vessel was sometimes half full of these animals; at other times they were mixed with the stools. He thinks that altogether the quantity evacuated must have amounted to several quarts. The larvæ were all nearly of equal size, and, when first passed, quite alive, moving with great activity. The patient is not aware of having voided any thing of the kind before. Since the discharge ceased, his health has improved, but it is by no means perfectly re-established; and he is fully impressed with the belief that at the present time (March, 1837) more larvæ are still in the stomach and intestines.

Immediately on examining the above larvæ, specimens of which were procured by Dr. Haviland, and submitted to my inspection, I formed the opinion that they were those of some dipterous insect; and, from their possessing branchial-like appendages, that the species was one which, during its first state, was, if not decidedly aquatic, at least an inhabitant of moist places. This opinion was afterwards confirmed by Mr. Hope, to whom I exhibited the specimens when in London last February. The same gentleman drew my attention to a case already recorded by Dr. Bateman,* in which, judging from his annexed figures more than from his slight and evidently inaccurate description, there was reason to believe the very same larvæ had been observed under similar circumstances. In fact, Dr. Bateman mentions two instances: one, in which a considerable number were ejected from the stomach of a labouring man at Norwich; another, in which they were found intermixed with the alvine discharge of a patient, who believed them to have been evacuated from his bowels, although the surgeon who attended him was doubtful whether they might not have been generated in the water-closet. Those obtained in the former of these instances, and which, as in the case now before us, were alive and moving for some time after they had been discharged, were considered by Dr. Bateman (on the authority of Mr. Bracy Clark) as the larvæ of the *Musca domestica minor* of De Geer,† which is synonymous with the *Musca stercoraria* of Swammerdam, by whom the larva is figured, under the name of *Vermiculus latri-*

* *Edinb. Med. and Surg. Journ.* vol. vii. p. 41.

† *Hist. des Ins.* tom. vi. p. 26. 5. Dr. Bateman states, however, that De Geer has figured both the fly and its larva, which I do not find to be the case.

narum.* Of the correctness of this opinion, and moreover of the identity of my own specimens with those figured by Swammerdam, I have but little doubt. Whether Meigen is right in referring De Geer's species to the *Musca canicularis* of Linnæus,† the *Anthomyia canicularis* of his own work,‡ I leave to be determined by others. I shall however annex an accurate description of the larvæ in my possession, which will afford the best means of leading hereafter to the detection of the particular species, which in the present instance at least became an inmate of the human intestines. And even supposing this point to be determined, it may still be valuable from the circumstance of that great variety of structure which appears to prevail in the larvæ of the *Diptera*, and the increased interest taken at the present day in the first stage of metamorphosis of insects in general.

Length, 4½ lines; greatest *breadth*, 1¼ line; *colour*, uniform ochreous yellow; *general form*, oval, considerably elongated anteriorly, much depressed, especially the head and thorax, which are nearly flat; *body*, composed of twelve membranaceous segments, of which, however, only eleven are obvious.

First apparent segment of a somewhat indeterminate shape, square, approaching triangular, the sides not being exactly parallel, and its width least at the extremity, which is bounded by a straight line. No antennæ or eyes; but in the middle of each side a projecting coronet of minute air tubes, arranged in a semicircular form, which might easily be mistaken for the latter.§ In front is a simple opening, showing externally, in its quiescent state, only a pair of minute appendages resembling palpi; within, however, it is furnished with a protractile process, being the head, terminating in a pair of horny bristles, representing the mandibles. This process is distinctly visible through the integuments, appearing as a black streak, and is probably capable of being exserted considerably beyond the mouth.

Second segment in form resembling the first, excepting that the sides, which are anteriorly inclined to each other, as in that segment, alter their direction about the middle of their course, and become parallel. The length and greatest breadth of this segment

* *Bibl. Nat.* tab. 38, figs. 3 and 4.

† *Syst. Nat.* (edit. 12), tom. i. p. 992, 80.

‡ *Zweiflug. Ins.* v. p. 143. [Bouché (*Naturgesch. der Insect.* p. 89, pl. vi. fig. 3,) has figured the larva of *Anthomyia* (*Homalomyia*) *canicularis* of Meigen, and his figures, making allowance for their acknowledged rudeness, evidently represent these larvæ.—J. O. W.]

§ Evidently considered as such by Dr. Bateman, who appears also to have regarded the first pair of branchial-like appendages as *antennæ*.

are nearly equal. *Third* similar to the second, but its greatest breadth nearly double its length. *Fourth and succeeding segments* also similar, but with their lateral margins more rounded, and their transverse diameters continually increasing to the *seventh*, then again diminishing. *Eleventh*, or terminal segment, viewed dorsally, of a somewhat semicircular form, its posterior margin being curved in a very regular manner. But on the ventral surface of the abdomen this segment is much less developed, and of a different form, being similar to the one preceding it, only smaller; behind it, also, is the anus, the lips of which appear to arise from the doubling of another rudimentary segment, representing the *twelfth*, and thus making up the typical number.

The first two segments of the body are much depressed, and bounded at the sides by a sharp edge common to both their dorsal and ventral surfaces. The remaining segments, which are thicker and more elevated, have the lateral margins of their two surfaces separated by an intermediate space of a softer texture, occupying the sides of the abdomen.

All the segments, excepting the first, are furnished with appendages apparently analogous to *branchiæ*. In the second segment there is but one of these appendages on each side, but in that of the third, and succeeding ones to the tenth, there are two, the upper one being attached to the dorsal, the lower one to the ventral, surface of the segment. The eleventh, or terminal segment, is set with six of these appendages, all arising however from the dorsal surface, and arranged semicircularly in one plane round the extremity of the body. These pseudo-branchial appendages become more developed, and more fringed with ramifications, as they approach the posterior extremity; the first pair, or those attached to the second segment, being nearly simple, or appearing as if clothed only with a fine pubescence.

The above segments are also furnished dorsally each with a pair of minute soft processes fringed with bristles, which, when viewed in the aggregate, form a double longitudinal series down the back. On the eleventh, or terminal segment, their place is taken by two stouter, somewhat corneous papillæ, of a cylindric form at bottom, but conical upwards, the apex being perforated with three orifices. These last are evidently air-tubes, which appear to be connected by internal trachæ with those on the sides of the head already spoken of.

There is also a double longitudinal row of still more minute processes on the ventral portion of the body, a pair occupying each of the same segments above alluded to, but placed more la-

terally, or further from each other, than those on the dorsal surface. These perhaps represent the prolegs of other larvæ.

It would be a matter of great interest, as well as importance, to ascertain by what means the larvæ above described were introduced into the human body. I regret, however, my inability to throw much light on this inquiry. It is observable that the symptoms of which the patient complained first showed themselves in the spring of the year, which is the season in which, under ordinary circumstances, the larvæ would be hatched. The larvæ were not voided till the summer and autumn following, when they appear to have been nearly, if not quite, full-grown. Hence it would seem probable that they were conveyed into the stomach in the egg state, and that after being hatched, they passed thence into the intestines, where they would have no difficulty in finding subsistence, if, as De Geer states, they reside naturally, during this period of their existence, in the ordure of privies. Dr. Bateman seems to have been of opinion, that, in the cases recorded by him, the larvæ were taken into the stomach with the water drunk, or otherwise used by the patient. But I think it questionable whether they are likely to occur in water, which was not largely mixed up with either decayed animal or vegetable matter, and which, from the presence of such impurities, would be scarcely used for the purpose above-mentioned.

I found, also, on making inquiries, that in the case under consideration, the patient, who has lived in his present house for many years, has *never* drunk water unmixed, but generally beer, tea, and such beverages. At the same time it was added, that the water used is entirely supplied from a *pond* on a stiff clay.

How far the above particulars will enable others to arrive at any probable explanation of this occurrence is perhaps doubtful. But when combined with the circumstances under which parallel cases may be hereafter noticed, they may possibly lead to some conclusion of practical utility towards checking so unpleasant a source of disorder in the human frame.

Plate XV. Fig. 1. The larva above described of the natural size. Fig. 2. The same seen from above, and magnified. Fig. 3. The same seen from beneath. Fig. 4. One of the branchial-like appendages. Fig. 5. One of the supposed antennæ. Fig. 6. One of the dorsal tubercles. Fig. 7. One of the spiraculiferous tubercles of the last segment seen laterally. Fig. 8. The same, seen from above. Fig. 9. One of the ventral tubercles.

XXX. *Observations upon the Economy of a South American Species of the Coleopterous Genus* Upis, *with a few Remarks upon Carpophagous Insects in general.* *By* J. O. Westwood, *F.L.S.*

[Read 7th March, 1836.]

At the February meeting of this Society, the Rev. F. W. Hope exhibited a large seed from the banks of the river Amazon, the interior of which had been consumed, but was still occupied, by a Coleopterous insect belonging to the genus *Upis*. This gentleman having had the kindness to place the subject in my hands with a view to bring it before the Society in a more detailed manner at a future meeting, I beg leave to offer the following account of it to the members, premising that it was necessary, in order to arrive at the most satisfactory method of attempting the investigation, to examine into the modes of proceeding adopted by other fruit-devouring insects,—a short summary of which will form a useful and not uninteresting introduction to the more immediate object of the present communication.

Of all our insect enemies none are more annoying than those which attack fruit and grain in its ripened state. To say nothing of that minor misery of human life, the cracking of nuts, or the biting of fruit, and having the mouth filled with a quantity of powder-like matter, which we know to be nothing else than the excrement of an insect which is at the same time, in all probability, writhing beneath our teeth, there is nothing more discouraging than to find that, after the careful watching of the flowering season and the setting of the fruit, the latter, even after attaining its full growth, is rendered unfit for use by the presence of some of these tormenting objects. Here they grow to their full size without their presence being even suspected, and the consequence is, that the harvest of the fruiterer is often rendered abortive at the very moment when he was looking for the gathering of his crop. But even here we find a beautiful connection of cause and effect. These insects, in their early state, are so tender in their constitution, that unless protected from the action of the air or the heat of the sun by such a covering as is afforded by the substance of fruits, they would inevitably perish; indeed it is impossible not at once to perceive that these very insects have been destined by an All-wise Creator to be participators with ourselves of the rich repasts of the fruit garden. Some fruit, as apples, pears, &c. arrive

at maturity before the rest of the same description of fruits, and fall to the ground, having yielded not to over ripeness, but to the internal attacks of these small destructives. Some fruits, however, appear to be free from their attacks,—grapes are not attacked in their bunches, and Réaumur tells us that the common almonds are free from them. This author states that the eggs of fruit-devouring Lepidopterous insects are placed by the females upon the fruit, although sometimes they are so small and young, that the petals of the flower have not yet fallen, and that even sometimes they are deposited in the midst of the petals and the pistil. The grubs, which are soon afterwards hatched from these eggs, thus find themselves at their birth placed upon a tender fruit, into which they immediately burrow without difficulty, where they then find themselves in the midst of food which they love, and are also completely hidden from view. The entry which they thus make in the fruit closes so completely, that it is difficult, or indeed impossible, to discover the little passage by which they have gained admission. With this explanation as to the mode of introduction of insects within the interior of the fruit, Réaumur has given us the history of various species of insects detrimental to the fruiterer or seedsman, including that of a large Lepidopterous caterpillar found in the pod of Haricot beans, a species of butterfly apparently belonging to the genus *Thecla*, the larva of which is found in the pod of the bladder nut; that of *Bruchus granarius*, *Tinea hordei*, *Tephritis cerasi*, *Tortrix pomonana*, &c. From these inquiries, M. Réaumur considers that the caterpillars of these frugivorous species do not quit the fruit until they are prepared to become chrysalides, and that when they quit their abode, it is not with a view of again returning there. Moreover, one insect alone is found in each fruit, unless it happens that two distinct species of larvæ are found in the same fruit; hence he concludes that the female has the instinct to deposit only a single egg in each fruit, and hence that each female has the means of ascertaining in some mode or other whether the fruit has already been visited either by herself, or by another female of the same species. This is a curious circumstance, when we consider that the size of some fruits is such that one would be sufficient to supply a whole colony of small larvæ. And he repeats more than once his opinion, that notwithstanding the hardness of their coverings, these fruits are pierced by the insect at a time when they are still tender. In his last observation, however, he adds, that the fruit is pierced "soit par la mère de l'insecte, soit par l'insecte naissant."

From these observations it is however evident, that as to the mode

in which the fruit is pierced, and whether this be done by the parent insect or not was entirely conjectural, no distinct fact was adduced beyond that of the actual piercing of the fruit, as indicated by a small cicatrix.

A more direct observation is, however, made by Messrs. Kirby and Spence relative to the *Rhynchites Bacchus* (upon the authority of Trost, *Kleiner Beytrage*, 38), which is said to bore with its rostrum through the half-grown fruit of the cherry into the soft stone, and there deposits an egg. The peach of North America is said to be similarly attacked by a weevil, and the proceedings of the nut weevil are asserted to be also similar. This proceeding, which at first sight appears altogether so unnatural, when we reflect upon the beautiful construction of the ovipositor of insects, has been fully confirmed by Kollar and Schmidberger. In endeavouring, moreover, to discover the mode in which the entrance of the insect into the fruit is effected, I consider that much more notice than has hitherto been given should be paid to the nature of the fruits attacked, namely, whether it be a soft fleshy fruit, defended only by a thin rind, or a nut-like fruit, encased in a hard shell. Thus, for instance, in the case of the nut weevil, it is evident from the great voracity of newly hatched larvæ, that if we adopt Réaumur's opinion, that it is the newly hatched grub which makes its way through the still tender shell of the nut, it would follow that the supply of food would be very quickly consumed; but if we consider that it is the parent insect which with her ovipositor deposits the egg in the substance of the nut, but which does not hatch for some time afterwards, we shall be able to account for the fact, that the kernel of the nut is sometimes not half consumed. Again, in the apple grubs, we find the pips in the centre of the apple are first devoured; they are in fact the genuine food of the newly hatched larvæ; but how came the larvæ into the centre of the apple? the moth not having an ovipositor of sufficient length to reach the core. But also here if we consider that it is the parent insect which with her ovipositor deposits the egg in the substance of the apple whilst very tender and young, and that the eggs are not hatched until the apple has attained a considerable size, we shall be enabled without difficulty to arrive at a solution of our question. But, it will be asked, can the egg be carried along with the development of the apple, and be found at a later period in the centre of the fruit, perhaps an inch and a half distant from the spot where it was actually deposited? I see no difficulty in this question; as the eggs of the gall-flies are carried forward with the development of the gall to an equal distance. And thus we

may account for the birth of the caterpillar of a minute and delicate moth, within the stone of a peach or a cherry.

Offering, therefore, this solution as to the discovery of grubs in the heart of any large fruit, I may now notice the circumstance, that the *Bruchus granarius* is stated to deposit an egg on every pea in a pod, which the grub, when hatched, destroys; this again appears to me to be an assumption unsupported by direct observation, or reconcileable with what occurs in other instances;—that more than one grub may be found in a pod of peas is unquestionable, but it appears to me to be much more probable that they should have been produced from eggs deposited by separate beetles, or that, if deposited by a single insect, they should have been deposited in one spot, rather than the female should have bored through the pod at regular distances, according to the situation of the grains.

Some of the species of flags, *Iris pseudacorus* and *fœtidissima*, the seeds of which are contained in a large pod, are attacked by the *Mononychus pseudacori*, a small weevil; and in some of the pods which I collected in the Isle of Wight, several larvæ were found, which did not quit the pod to descend to the ground in order to undergo their transformations, but arrived at the perfect state within the pod,—thus affording an exception to Réaumur's statement, that these fruit insects quit the fruit to pass their transformations under ground.

I have mentioned these various particulars, because they were essential to our endeavours to learn the natural history of the insect exhibited at the last meeting.

The nut or shell in which this insect was inclosed was exceedingly hard, and it was not without the greatest difficulty that I was able to split it open with a penknife. It was $1\frac{3}{4}$ inch in length; the shell was about 1-16th of an inch in thickness, and near the extremity, at the upper end, was a hole about 1-4th of an inch in diameter, through which the antenna of the inclosed beetle was protruded; near this hole, on the opposite side of the shell, was another small hole about 1-10th of an inch in diameter, and through these holes a small piece of string had been passed. Representations of the nut in different positions are given in Plate XIV. Figs. 11, 12, 13, and 14. On inquiry, I learn from Professor Don, and several other botanists of eminence, that this shell is one of the seeds of *Achras Sapota*, or some allied species, a large fleshy fruit growing in South America, having from six to twelve of these nuts in the centre. This plant is the common *Sapota* or *Sapodilla* plum-tree or bully-tree. It is one

of the largest trees in the mountainous woods of Jamaica, and attains a height of thirty or forty feet. The fruit, when fully ripe, has a sweet luscious taste, and is considered an excellent article for the dessert. If not completely ripe, and some say almost putrid, it is acrid, and cannot be eaten. The ovary has from twelve to six divisions, the fruit being a many-seeded apple, the seeds being inclosed in compressed osseous nuts. On opening this seed, a perfect beetle belonging to the section *Heteromera*, family *Tenebrionidæ*, and genus *Upis*, was found. It was 11-12ths of an inch in length. The shell was filled with a wool-like substance, which the aforesaid botanists state to have been evidently introduced through the hole at the top. Notwithstanding, it was evident on burning a small portion of it, that it was not an animal substance; probably it was cotton, from the cotton plant. I have represented this insect at Fig. 15 of Plate XIV. of the natural size, and have only to observe respecting it, that I have seen the same insect labelled in Mr. Hope's collection with the specific name of *Morio*, although Schonherr, in his *Synonymia Insectorum*, gives that name as synonymous with our British *Tenebrio obscurus*. The insect is entirely of a black colour, with the exception of the hairs upon the tarsi, which are piceous; the third joint of the antennæ is considerably elongated; the thorax (upon the form of which the chief differences between *Upis* and *Tenebrio* rest) is somewhat cordate truncate, with the posterior angles acute, the lateral margins distinct. It is narrower than the elytra, which are obscure, and upon each of which are eight punctate striæ, the central ones being united behind.

Amongst the cotton which had been introduced into the shell I found the exuviæ of the preparatory states of this insect, but in so tattered a state that I was only able to make out the under side of the head and tail, and one of the feet; these I have represented in Figs. 16, 17, and 18. The mandibles of the larvæ are remarkably dilated, completely covering the base of the antennæ, which are capable of laying in the excavated part of their under surface.

I should conceive that the insect was—having arrived at the perfect state—on the point of endeavouring to make its escape, when it was discovered. That it had not been introduced in the beetle state into the nut was evident, because the breadth of its elytra was considerably more than the diameter of the largest hole; moreover the discovery of the exuviæ of the larvæ (which, it is to be observed, varies considerably from that of *Tenebrio molitor* in the structure of the tail) clearly proves that the insect

had been inclosed within the nut in its larva state. The question then arises, had it entered the nut whilst a small larva through the smaller aperture noticed above, or was the latter intentionally made by the discoverer of the insect, and was not the larva hatched from an egg deposited through the fleshy pulp of the fruit, and within the nut, whilst still very young, by the parent insect? I am induced from analogy to adopt the latter opinion. We are not informed of the precise circumstances under which the insect was found, whether it was discovered laying on the ground after the fall of the fruit and shedding of the seeds, or whether it was found thus endeavouring to escape on cutting open the fruit, of course before the seeds were shed. This might tend to solve the difficulty; but in the meantime I venture the above as the most plausible and probable conjecture. I have only to add, that the only other species of *Upis* whose proceedings have been noticed, is *Upis ceramboides*, a Swedish insect, which feeds upon the fungi upon trees.

XXXI. *Remarks on the above paper, by* W. Sells, Esq., *M. E. S.*

I have in my cabinet the pericarpium of Barbadoes'-pride (*Poinciana pulcherrima*), one of the most beautiful flowering shrubs in the West Indies; the seed-vessel is, like *Cassia fistula*, a lomentum, each seed being separated from the adjoining one by a strong ligneous partition. Upon opening it, I was surprised to find each loculamentum occupied by a species of *Bruchus*, all the seeds but one having been entirely eaten. The insects were severally enveloped in a coccoon, and were all in the state of imago but one, which had perished while in pupa. At what period of its growth the seed-pod had been attacked it is impossible to say; but it seems to me to be very probable, that in this and similar instances, where the female insect has to deposit its eggs in a fruit or seed-vessel that is much advanced, it may, in the resources of its instinct, be led to prepare the way for the working of its ovipositor, by first breaking open the surface with its mandibles.

Any information which it is in my power to afford you respecting the tree which bears the nut containing the insect in question is, I regret to say, rather of a negative character; as at present I am better able to say what it is not than what it is. You

appear to have been led to suppose the nut may be the produce of *Achras sapota*, or some allied species; and you then describe under that name the fruit of a totally different tree, as will appear presently. *Achras sapota, vel mammosa*, is commonly called *Mammee sapota*, and is of Linnæus, 6th class and first order, and natural order *Dumosæ*. The tree is cultivated at the Havannah, but is rare in Jamaica. From the only one I knew there, I possess specimens of the curiously-formed seed, some of which accompany this letter. The fruit is oval-shaped, tapering at each end, and the edible part is a most delicious pulp; the kernels of the seeds are used in making the liqueur called noyeau. In June 1815, a bucket-full of the fruit was brought off to a ship which called at the Havannah on her way to England, which the captain's lady kindly distributed among the passengers, with a request that they would return the seeds.

The fruit you describe is the *Mammea Americana*, or *Mammee;* it is of Linnæus, class *Polyandria*, and order *Monogynia*, and is the produce of a large forest-tree in Jamaica. The fruit is of coarse texture, rarely eaten, and never sought after; it is quite round, five or six inches in diameter, with a smooth skin of a pale yellowish brown colour, of a very thick leathery nature, within which is an orange-coloured, firm, fleshy substance, about an inch in thickness, of a peculiar but not unpleasant flavour. The seeds are very large, hard, and rough, occupying all the central part of the fruit, about six to eight in number, and in shape of the natural divisions of an orange. Some confusion has doubtless arisen from the circumstance of this wild fruit, which is never cultivated, and no one thinks of providing for the table, being called *Mammee*, while the rare and exquisite fruit first named is called *Mammee sapota;* when they differ much more from each other than the *apple* does from the pine-*apple*. I may add, that the nut containing the *Upis* is not that of the sapodilla or plum-tree, of which there are two sorts, both very common in Jamaica: one is called the Spanish Plum, and the other the Hog Plum.

The bully, or *bullet*-tree, from its extreme hardness, is a forest-tree of Jamaica. I only know it as a valuable timber, much used in mill-work and machinery.

XXXII. *Monograph upon the Hymenopterous Genus* Scleroderma. *By* J. O. Westwood, *F. L. S.*

[Read December 5, 1836.]

It is in the works of Latreille alone that we find any notice of the existence of the genus *Scleroderma*. In the fourth volume of the *Genera Crustaceorum et Insectorum* (page 119), we find an insect mentioned in the family *Mutillariæ*, under the name of *Sclerodermus domesticus*, and formed into a section of the genus *Methoca*, having the thorax (truncus) "elongato-cubicus, supra planus." In the *Règne Animal*, the genus *Scleroderma* is placed between *Myrmecodes* and *Methoca*, and described as not differing from the former "que par les palpes allongés et les antennes dont le second article est decouvert." As far as I am aware, no further description either generic or specific has ever been published; and, judging from an inquiry addressed by M. Guérin to the Entomological Society of France, it would seem that the French entomologists are entirely ignorant of it. Having examined a number of individuals belonging to this genus contained in the Royal Museum of Berlin, and being in possession of others communicated by various friends, I have thought that a description of the genus and its various species, accompanied by a few observations upon its affinities, may not be considered uninteresting from the curious characters of the group.

Scleroderma, Klug. MSS. *Sclerodermus*, Latreille olim.

Characteres generis ex individuis apteris, seu fœmineis, desumpti.

Caput magnum, horizontale, quadratum seu oblongum; angulis posticis plus minusve rotundatis; depressum aut subdepressum. *Oculi* parvi subovales, immersi, ad angulos anticos capitis locati. *Ocelli* nulli. *Antennæ* in medio marginis antici capitis inserti, supra os, capite vix longiores, 10-articulatæ; scapo elongato, reverso-conico; pedicello brevi, obconico, flagello articulis contiguis; latitudine longitudinem æquante, ultimo obtuso. *Os* ad marginem anticum paginæ inferioris capitis locatum, incisione lunari, inter angulos anticos capitis ducta et ad quartam partem hujus paginæ vix attingente. *Mandibulæ* sat magnæ elongato-triangulares, incisione pone apicem, dentibusque duobus aut tribus parvis versus apicem marginis interni, dorso setoso. *Maxillæ* et *Labium*, ore clauso, omnino occulta. *Maxillæ* lobis duobus arcte connexis, membranaceis, ciliatis. *Palpi* maxillares maxilla haud longiores 5-articulati, articulis longitudine

æqualibus at latitudine sensim decrescentibus, ultimo graciliori, ad apicem setis nonnullis longioribus. *Mentum* crateriforme. *Labium*, in individuo exsiccato, parvum integrum subrotundatum. *Palpi* labiales triarticulati, magnitudine sensim decrescentes. *Thorax* elongatus, subdepressus; *collare* seu *prothorax* subquadratus, anticè attenuatus et tertiam partem thoracis occupans. *Mesothorax* parvus, scutelliformis, lateribus dilatatis. *Metathorax* subquadratus aut oblongus, posticè rectè truncatus, angulis posticis prominulis. *Alæ* nullæ. *Pedes* breves, femoribus crassis, oblongis, posticis obclavatis; tibiis simplicibus, apicibus paulo crassioribus, tarsis 5-articulatis, simplicibus, unguibus parvis. *Abdomen* capite cum thorace plus minusve longius, oblongo-ovatum, subconvexum; pedunculo brevissimo cum thorace connexum; *oviductus* minutus, subprominulus.

The external characters of this genus appear, it is true, at the first sight, to be almost identical with those of *Myrmeeodes* and *Methoea*, amongst the *Mutillidæ:* but it appears to me that *Scleroderma* is much more nearly allied to some of the genera of *Proctotrupidæ*, especially *Omalus*, Jur.—*Epyris*, Westw. (*Bethylus p. Panzer*)—*Cephalonomia*, Westw.—*Ceraphron*, &c.; in which the females of some of the species are apterous, and in some of which we find the joints in the maxillary palpi fewer than the typical number; the structure of the antennæ and ovipositor have not the appearance of those of a strictly aculeate *Hymenopterous* insect, as *Myrmeeodes* or *Methoea*, whilst the generally small size of the insects is in favour of their relation with the *Proctotrupidæ*.

That these genera depart indeed from the general character of that family, and approach the *Mutillidæ*, is evident. Thus Nees von Esenbeck asks, "Whether the genus *Meria* does not belong to the family or subfamily *Dryinei?*" adding, "Habitus maxime convenit, sed alarum nervi magis completi, areolas plures distinctioresque construunt. Certo certius, hoc genere intercedente, *Dryinei Mutillariis* arctissime connectuntur."—*Hym. Monogr.* 2, p. 397. Mr. Haliday also observes, "*Bethylorum* genus abnorme, inter *Oxyuros* jam diutius exulat, quippe cui locum [et familiæ gradum] inter *Hymenoptera Fossoria* vindicant trophi, aculeus (venenatus acris) habitus et mores. Conferendæ generis *Stigmi* species abdomine subsessili, ex. gr. *Stigmus Troglodytes*, Vander Lind."—(*Ent. Mag.* i. 276.)

I cannot, however, agree with Mr. Haliday in regarding *Bethylus* as a fossorial genus, much less in associating it with

the family to which *Stigmus* belongs. The connexion between *Bethylus* and *Ceraphron*, *Gonatopus*, &c. being so clearly established by means of various fine exotic insects in the Royal Museum at Berlin (of which I purpose hereafter laying descriptions and figures before this Society), that I feel convinced of the propriety of regarding *Bethylus*, *Sclcroderma*, *Gonatopus*, &c., as belonging to the family *Proctotrupiens* of Latrielle. This conviction, as regards the genus at present under review, is confirmed by the examination of two insects which I have but little doubt are male *Sclerodermæ*. It is true I am unable to state positively that this is the case; but their entire habit and form, the circumstance of their being males whilst females only of *Scleroderma* are known, and our previous acquaintance with the sexes of the other chief genera belonging to this family, leave but little doubt in my mind upon the subject. These insects may be described as follows.

Characteres generis ex individuis alatis (masculis existimatis) desumpti.

Caput quadratum, angulis posticis rotundatis, depressum, thoracis latitudine. *Oculi* ad angulos anticos, satis elevati. *Ocelli* 3 versus partem posticam capitis. *Antennæ* frontales approximatæ, capite duplo longiores, graciles, 12-articulatæ; scapo recurvo, conico, pedicello obconico; articulis reliquis æqualibus. *Thorax* oblongo-ovatus, collari anticè attenuato; metathorace posticè rectè truncato. *Alæ* longæ, ferè enerves, nervo ferè inconspicuo, subcostali, brevissimo, ad apicem ejus cum costa coalito, nervum brevem emittente, margine alarum ciliato. *Pedes* satis graciles, femoribus crassioribus. *Abdomen* ovatum, subconvexum, thoracis magnitudine. Color insectorum luteus, rufescens, seu fuscus.

The two male insects which have afforded the above characters are described at the end of this Monograph.

Of the European species of the genus there appears to be either a considerable number, as indicated below, or the colours and sizes of the species are very variable. From the rarity of the insects, it is not possible at present satisfactorily to decide whether some of the species described below may not possibly be varieties of the others; certainly, when placed together, they appeared to Dr. Erichson (who assisted me greatly in my researches at Berlin), and myself, to constitute so many species.

The females of this genus have considerable resemblance at first sight to the females of my genus *Theocolax*, with which they also appear to be somewhat allied in their subdomestic habits. A

specimen of *Scleroderma*, forwarded to me by M. Boyer de Fonscolombe, having been found by him in his "Musée," and M. Bouché informing me that he finds the insects crawling slowly about the old stumps of uprooted trees in his garden at Berlin.

Species 1. *Scleroderma domestica.*

Piceo-rufescens, nitida, lævis; margine postico segmentorum abdominalium pallidiori; antennis fulvis, articulo basali, ad basin, obscuro; femoribus piceo-rufis; tibiis pallidioribus; tarsis pallidè luteis. ♀

Long. corp. lin. $2\frac{1}{2}$.

Habitat Berolini. D. Klug.

In Mus. Reg. Berol.

Species 2. *Scleroderma thoracica.*

Picea; thorace ferrugineo, capite piceo-rufo, margine postico segmentorum abdominalium rufescenti; pedibus ferrugineis, tarsis pallidis. ♀

Long. corp. lin. $2\frac{1}{3}$.

Habitat in America Boreali.

In Mus. Reg. Berol.

Species 3. *Scleroderma abdominalis.*

Capite luteo-fuscescenti, posticè rufescenti, thorace pallidè luteo, collaris margine postico obscuro, abdomine nigro nitido; antennis pallidè luteis, pedibus luteis, femoribus tibiisque in medio fulvis. ♀

Long. corp. fere $1\frac{1}{2}$ lin.

Habitat Marseilles. D. von Winthem.

In Mus. Reg. Berol.

Species 4. *Scleroderma nitida.*

Lutea, nitidissima; capite fuscescenti, abdomine piceo basi apiceque rufescentibus, elongato-ovato, subconvexo; capite quadrato, angulis posticis rotundatis, meso et metathorace ferè æqualibus. ♀ (An. var. Sc. abdominalis?)

Long. corp. lin. $1\frac{1}{3}$.

Habitat in Gallia Australi, in Musæo Dom. Fonscolombe.

In Mus. nostr. Communic. Dom. Fonscolombe.

Species 5. *Scleroderma unicolor.*

Luteo-fulva; abdomine paullo obscuriori, breviori, magis acuminato, capite ferè rotundato, depresso, thorace vix latiori. ♀

Long. corp. lin. $1\frac{1}{4}$.
Habitat Berolini. D. Klug et Bouché.
In Mus. Reg. Berol. et nostr. Commun. Dom. Bouché.

Species 6. *Scleroderma fasciata.*

Præcedenti valde affinis. Differt magnitudine paullo minori, capite posticè magis angulato lateribus rectis (seu quadrato), thorace breviori; abdomine fusco margineque postico segmentorum 3 basalium pallido; antennis pedibusque pallidè luteis. ♀
Long. corp. lin. $1\frac{1}{6}$.
Habitat Berolini. D. Klug.
In Mus. Reg. Berolini.

Species 7. *Scleroderma formiciformis.*

Capite magno, quadrato; thorace multo angustiori; abdomine latiori; capite thoraceque fulvo-fuscis; pedibus antennisque pallidè fulvis; abdomine piceo, dimidio postico rufo, fasciâ transversâ, apiceque obscuris. ♀
Long. corp. lin. $1\frac{1}{4}$.
Habitat Berolini. D. Klug.
In Mus. Reg. Berol.

Species 8. *Scleroderma cylindrica.*

Subcylindrica, fulva; capite fusco; abdomine elongato, subcylindrico, nigricanti, segmento basali apiceque segmentorum plus minusve piceis; antennis pedibusque luteis; femoribus paullo obscurioribus; meso et metathorace ferè æqualibus. ♀
Long. corp. lin. 2.
Habitat Previsa in Albania. Dom. S. S. Saunders.
In Mus. nostr. Communic. Dom. W. W. Saunders.

Variat statura minori, capite femoribusque obscurioribus. Long. corp. lin. $1\frac{2}{3}$. Ex insula Zante: vix species distincta?

Species 9. *Scleroderma rufescens.*

Rufescens; oculis abdominisque medio fuscis. ♀
Long. corp. $\frac{1}{2}$ lin.

"Totum corpus cum antennis et pedibus e piceo-rufescens læve nitidum. Abdominis segmenta media fusco-picea. Caput subquadratum. Thorax linearis, capite paulo angustior, prothorace et metathorace æqualibus. Pedes breves validi, femoribus crassis paulo obscurioribus."

Habitat "Autumno a. 1809 in horto Sickershusano ad terram."

Syn. *Omalus rufescens.* Nees ab Esenbeck. Hym. Monogr. 2, 397. 7.

Species 10. *Scleroderma fusca.*

Aptera fusca; antennis, thorace pedibusque rufo-piceis. ♀

Long. $1\frac{2}{4}$ lin.

Statura linearis, *Staphylini* cujusdam. Caput thorace latius, subquadratum angulis obtusis, fusco-nigrum. Mandibulæ apicè quadridenticulatæ, piceæ. Prothorax piceo-rufus. Metathorax reliquo thorace paulo obscurior. Abdomen fuscum, segmentorum marginibus anoque acuto, piceis. Pedes piceo-testacei.

Habitat Carlsruhae. In Mus. Dom. Geyeri.

Syn. *Omalus fuscus.* Nees ab Es. Hym. M. 2, 396. 6.

Species 11. *Scleroderma intermedia.* (Pl. XV. Fig. 10.)

Luteo-fulva; antennis pedibusque concoloribus; abdomine elongato-ovato, depresso, fusco; disco segmentorum dorsalium pallidiori; metathorace quam mesothorax longiori, capite ferè rotundato. ♀

Long. corp. lin. 2.

Habitat Berolini in hortis supra truncus et radices arborum eradicatarum ambulans. Dom. Bouché.

In Mus. nostr. Communic. Dom. Bouché.

Pl. XV. Fig. 10 a, underside of head and antennæ; 10 b, mandible; 10 c, maxilla; 10 d, labium.

Species 12. *Scleroderma Mexicana.*

Præcedentibus minor, luteo-fulva; capite thorace latiori, depresso, oblongo, angulis posticis rotundatis; antennis fulvis ad apicem obscurioribus, articulis terminalibus transversis latioribus; thorace magis elongato posticè attenuato; abdomine thorace majori, latiori, nigro, (segmentis duobus basalibus exceptis;) subdepresso, apice segmentorum paullo pallidiori. ♀

Long. corp. lin. 1.

Habitat in Mexico.

In Mus. Reg. Berol.

Species 13. *Scleroderma contracta.*

Pl. XV. Fig. 11. 11 a, mandible; 11 b, antenna.

Piceo-rufa; capite subrufescenti, punctato; pedibus fulvo-rufis, collari angusto, metathorace valdè elongato lateribus in medio

(in latitudinis dimidium), contracto, parte postica multo angustiori, rotundata, punctata; abdomine elongato-ovato, depresso, setis rigidis tecto; mandibulis acute tridentatis. ♀

Long. corp. lin. $3\frac{3}{4}$.

Habitat in Carolina. Dom. Zimmerman.

In Mus. Reg. Berolin.

Species 14. *Scleroderma picea.*

Piceo-nigra, nitidissima; collare segmentoque basali abdominis magis piceis, geniculis antennarum pallidis, tibiis tarsisque magis rufescentibus; abdomine thorace multo latiori.

Long. corp. $1\frac{2}{3}$.

Habitat Previsa in Albania. Dom. S. S. Saunders.

Species 15. *Scleroderma pedunculus.*

Pallidè lutea, capite abdomineque ante medium fulvis; antennarum articulis apicalibus, mandibulis, oculis petioloque abdominis nigris; pedibus pallidissimis, capite et abdomine thorace multo latioribus.

Long. corp. lin. $1\frac{1}{8}$.

Habitat in Insula Zante, Augusto. Dom. S. S. Saunders.

Species 16. *Scleroderma minuta.*

Griseo-lutea; abdomine lato, depresso, piceo; antennis pedibusque pallidissime lutescentibus, oculis nigris.

Long. corp. lin. $\frac{7}{8}$.

Habitat Previsa in Albania, Julio, 1838. Dom. S. S. Saunders.

The three last described species, together with specimens of *S. cylindrica*, and its presumed variety, have been recently (February, 1839) brought to England by S. S. Saunders, Esq., who has assiduously studied the entomology of Albania, and to whom I am indebted for the following interesting particulars relative to the habits of these curious insects.

"I have found the apterous specimens of *Scleroderma* in various parts: one species (*S. cylindrica*) is far from uncommon at Previsa and Santa Maura, frequenting houses, and rendering itself particularly obnoxious by acutely stinging the exposed parts of the body, the greater part of the specimens I have taken having thus brought themselves to notice. The small castaneous species (*S. pedunculus*) I have met with at Zante as well as at Previsa, and in both cases in the house: indeed I never found any of the apterous

Scleroderma out of the house except on one occasion. This was at a place some hours distant from Previsa, where, dining under a fig-tree, two specimens of the large black species (*S. picea*) were found upon some of the party. This was in the middle of May. I have met with the others from March to September, and the small castaneous species in June and July. I never could discover the habitat of the *Sclerodermæ*. I have had them come on my paper whilst writing, and the ceilings being of wood, and perforated with minute holes, I fancied that they might have dropped from thence, but I never could obtain a single specimen by examining the wood-work in the most careful manner."

Mr. Saunders has also brought to England specimens of two species of minute winged *Hymenoptera*, which differ materially from those regarded in the commencement of this paper as the males of *Scleroderma*. Upon these insects Mr. Saunders has communicated the following observations:

"Of the winged specimens, which I always considered to belong to the *Scleroderma*, these were in like manner taken in and about my house at Previsa, the larger one being captured close outside. They were found towards the end of August and in September. I am the more inclined to believe these, or at least the smaller ones, to be winged specimens of the *Scleroderma*, as I never met with any other insect which could be supposed to supply their place; and I hardly think, under all the circumstances, that they could have escaped me altogether."

Without presuming to assert that these insects are not the males of *Scleroderma*, I can scarcely consider such to be the case, for the following reasons. In the general form of the elongated body, and especially of the collar, these winged specimens, it is true, very greatly resemble the females. They have also 13-jointed antennæ; but they differ, inter se, in the veins of the wings. The largest specimen belongs to my genus *Epyris*, the basal veins of the wings not extending so far as in *E. niger*, and the ocelli are very nearly obsolete. The other two are smaller, with large ocelli, but without any radial branch to the upper wings, which have only the basal cells of *Epyris*. As I possess females of the genus *Epyris* with 13-jointed antennæ, furnished with wings, and armed with a long sting exserted in dying, and in which the ocelli are smaller than in the other sex, I am induced to believe that the apterous *Sclerodermæ* cannot be the females of these winged specimens, but which have winged partners. Having, however, collected numerous materials relative to the genus *Epyris*, which I propose to lay before the Society, I shall defer the description of

these winged specimens for that memoir, in which figures shall be given of them which will enable the Society to form a better judgment upon the question.

The following are the descriptions of the two insects which I have hitherto regarded as the males of this genus.

Species 13. *Scleroderma?* (♂ ?) *fuscicornis.*

Pl. XV. Fig. 12. 12 a, antenna, the last joint broken off.

Fulva; antennis (nisi articulis basalibus fulvis) fuscis; alis hyalinis, nubilâ pone medium, transversâ obscurâ; oculis cum regione ocellorum nigris; antennarum articulis subquadratis; pedibus fulvo-luteis.

Long. corp. $\frac{3}{4}$ lin. Expans. alar. lin. $1\frac{1}{2}$.

Habitat in Gallia meridionali.

In Mus. nostr. Communicat. Dom. Boyer de Fonscolombe.

Species 14. *Scleroderma?* (♂ ?) *fulvicornis.*

Rufescenti-fusca, collare antice et basi abdominis pallidioribus; alis pallidè hyalinis, nubilâ transversâ pone medium obscurâ; antennis pedibusque pallidè rufescenti-fuscis, antennarum articulis apicalibus oblongis, pilosis.

Long. corp. lin. 1 (ferè). Expans. alar. lin. $1\frac{3}{4}$.

Habitat Berolini. D. Klug.

In Mus. Reg. Berol.

XXXIII. *On the Notions entertained respecting the Emblem Scarabæus. By the Rev.* F. W. Hope, *M. A., F.R.S.*

[Read May 1, 1837.]

In Fosbroke's *Encyclopædia of Antiquities*, there is a short abstract of the opinions of authors respecting the *Scarabæus*, where he states as follows. The Egyptians worshipped this insect, and made it the symbol,—

1st. Of the world, because it rolled its excrements into a globe.

2dly. Of generation, because it buried the bowls in which it included its eggs.

3dly. Of an only son, because they believed every beetle was male and female.

4thly. Of valour and manly power, while they forced all soldiers to wear a ring on which a beetle was engraved: *i. e.* an animal perpetually in armour, who went his rounds during the night.

5thly. Of the sun; 6thly. Of the moon from horns; and
7thly. Of one-horned Mercury.

It is mentioned also by the same writer as an emblem adopted by the Romans, who made it a part of some of their legionary standards. Without entering into a discussion of the various opinions above stated, it may be asserted generally that they are gathered from the writings of antiquity; some of them are too trivial to deserve a remark, while others have with some reason been accredited. After considering the origin of the emblem of the *Scarabæus* attentively, I am inclined to think that its primary signification has been strangely overlooked, while more weight has been attached to secondary, and sometimes visionary interpretations. I will therefore suggest another.

That the Egyptians believed in the immortality of the soul cannot be questioned; now it is probable that the *Scarabæus* was the emblem denoting that belief, or a belief in the reanimation of the body; and although I am little acquainted with the antiquities of Egypt, I think I shall be able to substantiate this interpretation. The *Hermitybies Calasiries* were the soldiery of Egypt; and it is asserted by Plutarch that they carried a ring, on which a beetle was engraved;* by others, "It is said that the Egyptians hung *Scarabæi* round their necks when going to battle." Now, if the *Scarabæus* was an emblem of a belief in the immortality of the soul, or of the reanimation of the body, the custom of putting them on previous to battle would imply that they were to act as a charm; and what charm could possibly inspire the raw recruit, or even the veteran, with more enthusiasm and courage than a belief that after they were killed in battle they should yet, at a future period, rise to life again? It may be probable that the Egyptians, who were exceedingly tenacious of the rites of burial, put these *Scarabæi* on before battle in order that if found on them when slain they might be distinguished from the enemy, and receive the rites of sepulture. It appears that the nobles and military, as well as the ladies of Egypt, wore the sacred *Scarabæi* about their persons while living; and in the coffins of the dead of the lower orders, as well as the higher, these emblems are usually met with. They are seen sculptured on the funeral tablets buried with the deceased, and are repeatedly found on the ornaments of the ring and necklace, and sometimes in pendants attached to them. It appears, then, to have been an emblem universally adopted, and it is not unlikely that Egyptian females wore them in their necklaces in the same way and for the

* Vide *Plutarch's Treatise of Isis and Osiris*, p. 13. "Of a like nature is that beetle which we see engraven on the signets of the soldiers."

same reason that Catholics carry the crucifix or cross, as an emblem of the religion they profess, and the God they worship. The next argument I have to adduce, are the situations in which these *Scarabæi* were placed on the mummies: they are found on the chest next the flesh, and under the eyelids; and why placed there, near the pulsation of the heart, and the organ of sight, the very situations of all others most indicative of life and animation. In concluding these remarks, it will be admitted by persons acquainted with Egyptian literature, that the *Scarabæus* may be considered as the emblem of fertility, of fecundity, and of generation, influenced by the sun; and it is not carrying my argument too far to assert, as we find the *Scarabæi* applied to the dead body in such places as near the heart and eye, that they may be regarded, since placed there, as indicating a belief that the heart would throb again, and the eye regain its sight; in short, that the body should be reanimated, and the soul, having fulfilled its term of transmigration, should re-enter the body again, and become immortal.

XXXIV. *Description of a new Genus of Coleopterous Insects from Corfu.* *By* J. O. Westwood, *F.L.S.*

[Read 3d October, 1836.]

Order COLEOPTERA, Linn.

Section Pentamera, Latr.

Tribe Serricornes, Latr.

Family Melyridæ, Leach. Melyrides, Latr.

Genus Amauronia,* Westw.

Corpus parvum, oblongum, pilosulum, punctatum.

Caput cum *oculis* thorace paullo latius. *Antennæ* capitis latitudine vix longiores, articulis obconicis, versus apicem paullo incrassatæ, pilosæ; articulo 1mo majori, 2do parvo, reliquis sensim crescentibus, ultimo ovato. *Labrum* semicirculare, porrectum, setosum, margine coriaceo. *Mandibulæ* trigonæ, corneæ, ad apicem bifidæ. *Maxillæ* lobis duobus distinctis pilosis. *Palpi maxillares* maxillarum longitudine; articulo 1mo et 3tio brevibus, 2do mediocri, subclavato, 4to maximo, elongato-securiformi. *Mentum* transversum, brevissimum. *Labii membrana basalis* distincta; apicalis (labium verum) subquadrata, ciliata. *Palpi labiales* 4-articulati, articulo 1mo

* Αμαυρός—obscurus, ab corporis colorem.

(seu scapo) cum membrana labiali coalito, 2do distincto minuto, 3tio longiori, subclavato; 4to 3tio paullo longiori ad apicem attenuato, truncato.

Prothoracis dorsum (*Pronotum*) subquadratum, lateribus paullo curvatis et postice sublatioribus, capite (præsertim anticè) angustius. *Scutellum* (mesothoracicum) distinctum, ferè semicirculare. *Elytra* ovalia, posticè paullo latiora, anticè subtruncata et thorace latiora.

Pedes mediocres, simplices; *femoribus* versus basin subincrassata, *tibiarum ealeari* obsoleto; *tarsis* simplicibus, omnibus distinctè 5-articulatis, articulis quatuor basalibus sensim decrescentibus, ultimo paullo longiori, graciliori; unguibus membranâ basali instructis.

This minute genus corresponds in several respects with *Dasytes* and *Melyris*, and still more particularly with *Pelecophora* of Dejean, a genus which, from the inconspicuous size of the basal joint of the tarsi, was placed by that author amongst the tetramerous Coleoptera near Lema. The structure of the mouth is not unlike *Peleeophora*, as figured by Guérin in his *Ieonographie du Règne Animal*, but the size of the head and basal tarsal joint, as well as the habit of the insect, entirely removes it from that genus. In *Dasytes* the maxillary palpi are filiform, but in the obscure colouring of the insect there is an evident relationship between the two genera. *Amauronia*, however, seems to form a very distinct passage (with the assistance of the quasi-tetramerous *Peleeophora*) to the smaller and obscurely coloured species of *Cleridæ*, which have also the basal joint of the tarsi minute, and the maxillary palpi terminated by a securiform joint. The insect forming the type of this genus is one of the most minute serricorn beetles.

Sp. unica. *Amauronia subænea.*

Pl. XIV. Fig. 10.

Æneo-nigra; rudè et irregulariter punctata et undique setis perbrevibus pallidis obsita; antennis fuscis, articulis 3 vel 4 basalibus fulvescentibus, elytris interdum chalybeo tinctis, pedibus fulvis, femoribus in medio obscuris, tarsorum articulis apicalibus fuscis. Magnitudo *Cisidis nitidi*, at angustior.

Long. corp. $\frac{5}{6}$ lineæ.

Habitat. in Insula Corfu. Dom. Templeton.

Pl. XIV. Fig. 10.

Amauronia subænea magnified. 10 a, upper side of head and antenna; 10 b, labrum; 10 c, mandible; 10 d, maxilla; 10 e, labium; 10 f, anterior; 10 g, intermediate; 10 e, posterior leg.

XXXV. *Description of six new East Indian Coleoptera.* *By* W. W. Saunders, Esq., *F.L.S.*

[Read 4th April, 1836.]

Melolontha Bimaculata. (Pl. XVI. Fig. 2.)

Head depressed, quadrate, the anterior angles rounded, deep dull brown, with the palpi and antennæ dark chesnut.

Thorax depressed, rather broader than the head and eyes in front, gradually widening and then slightly retracting from about the middle, the lateral margins slightly elevated and crenate, the posterior margin curving outwards, and the anterior margin nearly straight—of the same deep dull brown as the head.

Elytra ovate, rather broader than the thorax at the base, the lateral margins rather elevated, bright castaneous, with a small white oval spot on each, near the apex, the semi-oval scutellum and elevated margin somewhat darker.

Wings of a smoky brown.

Abdomen projecting beyond the elytra, greyish brown.

Legs dark castaneous, the fore tibiæ tridentate externally, with one small pointed tooth internally; the posterior tibiæ robust and conic, with long spurs.

Length, 2 inches.

From the East Indies, in the collection of Sigismund Rucker, Esq.

This appears nearly allied to *M. Commersonii Oliv. Ent.* 1 Div. Mel. Tab. 409, but differs in being smaller, having the fore tibiæ tridentate, and in other characters.

Jumnos Ruckeri. (Pl. XVI. Fig. 1.)

Head steel blue, projecting, quadrate, rather wider in front, with the anterior angles sharp, the lateral margins elevated and rough, with unequal tubercles, the anterior margin smooth and elevated, and the upper surface rough, with elevated spots, and partly covered with reddish brown hairs. Antennæ and palpi dark castaneous.

Thorax of a deep shining green, much depressed, and rounded in front, as broad as the head and eyes, then swelling out. and a little beyond the middle the sides running nearly parallel, the lateral margins entire and slightly elevated, and the posterior margin nearly straight, forming two blunt projections.

Elytra rather broader than the thorax, with the scutellum large,

triangular, of the same deep shining green as the thorax, with two large oval discoidal spots near the apex of the scutellum, and two broad fasciæ near the apex, extending from the margin nearly to the suture, rounded internally, and the posterior margin waved.

Wings black.

Abdomen projecting beyond the elytra, brassy green, partly covered underneath with reddish brown hairs.

Legs long, especially the first pair, green with shades of purple, the tarsi steel blue. *Tibiæ* of the first pair slightly curved, with a large tooth towards the apex externally, expanded at the apex into a tooth on either side, and all the under part covered in a remarkable manner with irregular and elevated tubercles ; of the middle and last pairs, straight, ciliated internally with long reddish brown hairs, and supplied each with a pair of spurs. Tarsi, with the joints tubercled underneath, especially in the first pair, and the last joint with a bundle of hair underneath, near the claws, in the two first pairs.

Claws very long and curved.

Length, $1\frac{3}{4}$ inches.

From the East Indies, in the collection of S. Rucker, Esq.

This splendid insect, nearly allied to *Cetonia*, I have ventured to propose as a new genus, but others more conversant with the group to which it belongs must determine whether I have acted rightly. The very remarkable fore legs, projecting tubercled head, protuberant thorax, and ciliated posterior tibiæ, are the external characters which have led me to this. The parts of the mouth I have not ventured to dissect and examine, the specimen being unique.

The specific name is after my friend Sigismund Rucker, Esq. a great friend of Entomology, and who kindly lent me the insects described in this paper, from a collection he has lately procured from the East Indies.

Pl. XVI. Fig. 1 a, head and thorax seen sideways ; 1 b, sternum ; 1 c, fore leg.

Lucanus Bicolor. Fab. var. (Pl. XVI. Fig. 3.)

Dark shining brown, almost black.

Head broad, quadrate, emarginate in front, wavy at the anterior angles, a sharp tooth on each side behind the eyes, two slight impressions on the front, and the part about the eyes underneath deeply truncate. Mandibles stout, projecting, almost as long as the head, dentate externally, with five or six rounded irregular teeth on each.

Thorax rather broader than the head, transverse, rounded on the

sides, emarginate at the posterior angles, the anterior margin curved outwards, the posterior nearly straight.

Elytra ovate, the margin slightly elevated, glossy testaceous, with a broadly based triangular patch extending from the base to the apex, and the elevated margin dark brown. Scutellum small, semi-ovate.

Legs long, the fore tibiæ dentate externally, with four or five pointed teeth, and a tooth and a spur at the apex; the posterior tibiæ with two spurs each. The joints of the tarsi spongy underneath.

Length, 2 inches.

From the East Indies, in the collection of S. Rucker, Esq.

Cerambyx Formosus. (Pl. XVI. Fig. 4.)

Head black, with the eyes and palpi pitchy brown. Antennæ rather longer than the body, with the third, fourth, and fifth joints slightly produced at the apex externally.

Thorax broader than the head, spherical, truncate, orange with four black spots above placed so as to form a diamond, the two lateral ones bearing a small spine.

Elytra broader than the thorax, orange with a black wavy band at the base, another broad transverse band wavy on the posterior margin, a little below the middle, and between the bands four round black spots, two large placed on the disk, and two smaller laterally, one near each shoulder.

Abdomen beneath dull orange.

Legs long and slender, black, with the thighs clavate.

Length, $\frac{7}{8}$ inch.

From the East Indies, in the collection of S. Rucker, Esq.

Lamia Croceo-cincta. (Pl. XVI. Fig. 6.)

Head vertical, black, with a large frontal yellow spot. Antennæ about two-thirds the length of the body, ciliated externally on the third, fourth, and fifth joints.

Thorax as broad as the head, cylindrical, produced laterally into two blunt spines, black, with a large lateral yellow spot on each side anteriorly.

Elytra broader than the thorax, the shoulders prominent, conic, truncate, black, with two broad yellow bands, one transverse towards the base, and another a little below the middle, inclining towards the shoulders.

Abdomen underneath yellow.

Legs short and thick, black, with the tibiæ underneath yellow.

Length, $\frac{3}{4}$ inch.

From the East Indies, in the collection of S. Rucker, Esq.

SAPERDA TESTACEA. (Pl. XVI. Fig. 5.)

Head black, with the palpi testaceous, and a dull brown spot on the vertex, near the thorax. Antennæ rather more than half the length of the body, black, with the bases of the third to the seventh joints dirty white, the first, second, and third joints covered with long bushy hairs.

Thorax rather broader than the head, pale testaceous, cylindric, with a blunt protuberance on each side, and three others forming a triangle on the vertex.

Elytra rather broader than the thorax, long, cylindrical, pale testaceous, with two small brown spots near the scutellum, deeply punctate all over, except towards the apex, and each elytron with three longitudinal elevated lines, two on the disk and one near the margin, the lateral anterior angles brown.

Abdomen underneath velvety black, with the apex testaceous.

Legs short, the first pair testaceous, with the outside of the tibiæ and tarsi black, the two posterior pairs black, with the knees and bases of the femora testaceous.

Length, $\frac{7}{8}$ inch.

From the East Indies, in the collection of S. Rucker, Esq.

XXXVI. *Observations in support of the opinion, that the* Blatta, *or* Cockroach, *cannot be considered the same Insect as* Oreb, *the Fly which humbled the pride of Pharaoh. By the* Rev. F. W. HOPE, *M.A., F.R.S., &c.*

[Read 6th March, 1837.]

MY much valued friend, the Rev. William Kirby, in his Bridgewater Treatise, (a work which has greatly tended to overthrow the futile theories of Lamarck), has in the second volume, p. 357, introduced the following remarkable passage: "It has been suggested to me by an eminent and learned prelate, that the Egyptian plague of flies, which is usually supposed to have been either 'a mixture of different species' (Aquila and Jerom), or a fly then called the dog-fly (*Oreb*), but which is not now known, was a cockroach." When I read this passage, it naturally excited my astonishment;

and the remarks which follow are the results of my investigations, which I now bring before the Society.

In conformity with the above extract, I have to add that Dr. Geddes gives an interpretation of the word Oreb as signifying "a swarm of beetles;" and in Dr. Harris's Natural History of the Bible I find a note appended to Geddes's opinion, which gives us even the name of the species, viz. the *Blatta Ægyptiaca* of Linnæus, and it appears that this rendering is supported by Oedman, Michaelis (Orient. Bibl. Nov. pp. 5, 38), and Rosenmuller, and it is added, "This is a very voracious insect, that not only bites animals, but devours tender herbs and fruits." Any entomologist must be aware that the above remark applies equally well to various flies, which feed alike on plants and animals. Had Geddes been a naturalist, he would probably have stated what swarms of beetles attack men and animals. I cannot help thinking that those authors who have adopted his opinion have been obliged to refer to the cockroach, as the only insect at all like a beetle which seems to favour their theories.

But let us proceed to inquire more minutely into this opinion. What are the species of beetle which swarm? if that term indeed may be used. It is singular that the word beetle, in our translation of the Bible, occurs only in Leviticus (xi. v. 22), "Of these ye may eat, the locust after his kind, and the beetle after his kind." I have little hesitation in saying that the context in the above passage leads me to think that the Hebrew word Chargol signifies a locust, and not a fly. On referring to Dr. Harris's Dictionary of the Bible, under the word Beetle, there is the following singular note: "The Egyptians paid a superstitious worship to the beetle *Blatta Ægyptiaca*, Linn." The Egyptians certainly never did so. Mr. Molyneux, however, in the Philosophical Transactions, (No. 234, Lawthrop's Abridgement, vol. ii. p. 779), says, "It is more than probable that this destructive beetle we are speaking of was that very kind of *Scarabæus* which the idolatrous Egyptians of old held in such high veneration." Now on turning to Mr. Molyneux's paper, you may judge of my surprise when I discovered that the beetle referred to was *Melolontha vulgaris*, the common European cockchafer, which abounded in Ireland in the year 1688. But as the Sacred Beetle of the Egyptians was either an *Ateuchus* or a *Copris*, it is only necessary to mention the errors which are here but too apparent, first, that *Blatta* was a beetle; and secondly, that the beetle, the object of the Egyptian worship, was destructive, which it is notorious was regarded as the emblem of fertility, fecundity, and generation, and certainly, as far as I

can judge, never yet swarmed, however abundant some species of Egyptian *Melolontha* may have been at particular times. The latter error seems to have originated in the inappropriate use of the word *Scarabæus*, which formerly signified an *Ateuchus* and *Melolontha*, and also other genera of the *Lamellicornes*. *Scarabæus*, by Mr. William Sharp Mac Leay, is now very properly restricted to those insects which Illiger has denominated *Ateuchus*.

Let us proceed, however, with our inquiry respecting other significations attributed to the word Oreb. It is allowed by all conversant with Hebrew, that the same word signifies a "Raven," or "Evening," and the arguments which have been adduced respecting a species of cockroach of a dark colour now infesting Egypt, and of its appearance in the evening, seeming to favour the above interpretation, will not I think bear investigation. The remark respecting the colour of the species of *Blatta* being dark, may be equally applied to various species of flesh flies, which rendering has also been given to Oreb. That the cockroach is a nocturnal insect, and prowls about for food chiefly at night, no one will dispute; but what reason, let me ask, have we to believe that the fly attacked the Egyptians by night and not by day. We are expressly told respecting the plague of flies (Vid. ch. viii. v. 23), "*to-morrow* shall this sign be," or as it is rendered in the margin of the Bible, "*by to-morrow*." Had this grievous plague been intended to occur at night, it would most likely have been previously specified, as *midnight* was, when Moses predicted the death of all the first-born in the land of Egypt. To proceed however. I have before stated that some expositors (viz. Aquila and Jerom) explain the term Oreb as "a mixture of various kinds of flies," and this explanation seems nearly to agree with that in our English translation, which is rendered "swarms of flies." (Vid. Exodus, viii. v. 21.) Bishop Patrick gives another interpretation, "a mixture of different insects," or "mixture of flies."

The Hebrew word Oreb is, in the Septuagint, invariably translated Κυνομυια, or dog-fly, and it occurs in seven different places in our Bible; and here I cannot help stating that I consider the terms of the translation adopted by the Seventy generally more significant and accurate than any other authority; for if the interpreters of the Hebrew text, living on the spot where the insects were generated, and who decidedly had far better means of identifying species than our modern European travellers and commentators,—if they invariably render the word Oreb, Κυνομυια, why should we at the present day, after the lapse of many centuries, presume to term this Κυνομυια, or dog-fly, a *cockroach?* Do the

Blattæ attack dogs? No naturalist can I believe affirm it. Do flies attack dogs? Undoubtedly. Why then has the question ever been raised?

The fly is the old and most natural interpretation, and should be retained, while the cockroach is of modern date, and unnatural, and difficult of explanation, and therefore should be abandoned.

Feeling fully persuaded, from what has been brought forward, that Oreb was a fly, and not a cockroach, I shall suggest a remark on the plague of flies, and on insectal worship, to which this inquiry has directed my attention, and shall then conclude by stating, that if Egypt of old was afflicted with flies, it is no less true that these ancient plagues have in their posterity survived the overthrow of kingdoms and dynasties.

That Egypt was celebrated for noisome flies may be gathered both from sacred and profane writers. Of the former I mention Isaiah, and of the latter Herodotus. The wonderful effects produced by flies led no doubt to their being idolized, but where insect worship originated is difficult to assert; if not in Chaldea, it was probably derived from Egypt, where beetle-worship prevailed. The Jews obtained their notions of fly-worship from the Philistines, and it may be a question, perhaps, whether the beetle-worship of the Egyptians was the same as the fly-worship of Baalzebub. The reproach of the Jews rendering Baalzebub in Baalzebul, that is, fly-god into god of dung, or dungy god, seems to imply that the fly and beetle had their origin in dung, which is in fact true.

The reason of the *Scarabæus* however being esteemed was, that it was an emblem of generation, and probably of benefit supposed to be connected with it, while that of fly-worship may be traced to a different source, namely, the sufferings which man endured from insects. On this point I shall not dilate any more, but quote a few authors to prove that Egypt is still infested with the curse of flies.

In Sonini's Travels, vol. iii. p. 199, speaking of Egypt, he states, "Of insects there the most troublesome are flies; both man and beast are cruelly tormented with them. No idea can be formed of their obstinate rapacity when they wish to fix upon some part of the body. It is in vain to drive them away, they return again in the self-same moment, and their perseverance wearies out the most patient spirit." In the above passage no particular locality or particular fly is specified. The zealous travellers, Forskal and Hasselquist, have mentioned both gnats and flies; the *former* asserts that at Rosetta and Alexandria there are immense num-

bers of gnats; one species, which he denominates *Culex molestus*, is exceedingly tormenting during the night; he mentions also *Tabanus testaceus ubique equis infestus.* The *latter* gives us two species of *Culex*, the gnat of Cyprus and the gnat of Egypt, as well as a species of *Musca*, named *Bupthalmi*, which is found on the common Ox-eye, near Damietta.

From the Symbolæ Physicæ of Klug it appears from what is already published, that there is no lack of flies; and my friend Mr. Wilkinson, the Egyptian traveller, has informed me that flies in Egypt are at this day a very serious evil; to his kindness it is that I am indebted for a short account of some of those which are most tormenting.

One fly named *Dthebab* causes a disease in camels, which continues three years if neglected; the animal then either dies or recovers, the disease having exhausted itself.

Dthebab is a long grey fly, which comes out about the rise of the Nile, and is like the *Cleg* of the north of England; it abounds in calm hot weather, and is very often met with in June and July both in the Desert and on the Nile. Many wounds inflicted by these flies on the camel produce disease; it only affects the camel once in this manner, the bite afterwards causing temporary pain and no disease. To the Arabs Mr. Wilkinson was indebted for the following description of the complaint and remedy: "The symptoms are, loss of appetite, general appearance of weakness; it receives no nourishment from the food it takes, grows very thin, and always looks towards the sun; if a female, it will take the male, and conceive, but is sure to miscarry after two months; the secretions generally are rendered impure and unwholesome. The cure is, either the blood of a wolf poured down the throat, or Kelbeh fænum græcum, and beans without the husk, given for two or three months." Mr. Wilkinson adds, "I have seen a camel to which wolf's blood was given; it recovered, but whether from that remedy or not I cannot pretend to say; however it is believed and tried, and the Arabs assert with invariable success." The above fly attacks man and other animals. A second species of fly, seemingly an *Hippobosca*, attacks man and beast. The common house fly is very abundant, as well as some small flies which live on trees; they emerge from their sheltered places as you pass, and get into the corners of the eyes. Lastly, there is a very minute fly near the Red Sea, which inflicts a burning bite, and is probably the same as that mentioned by Sonini.

XXXVII. *Notice of a minute Parasite inhabiting the Larva of the Stylopidæ; and upon the Animal produced from the Eggs of Meloe.* *By* J. O. Westwood, *F.L.S.*

[Read June 6, 1836.]

The more we learn of the *Strepsiptera*, the more extraordinary does this little tribe of insects appear; and the more does it require investigation, especially as regards the economy of its various species. With the hope to clear up some of the difficulties connected with these insects, I endeavoured, in the course of the past spring, to obtain information by capturing many specimens of *Andrenidæ*, and I succeeded in finding nearly a dozen specimens of *Andrenæ Gwynnana* and *parvula* flying about, infested with specimens of the larvæ of *Stylops*, of which the heads were exserted between the abdominal segments as usual. My exertions were however defeated by a very minute creature, which is parasitic upon the *Stylops*. During the pleasant trip, made last autumn from Bonn to Cologne, by the naturalists assembled at the former city, the Senator Van Heyden, who has paid great attention to this order of insects, informed me that he had observed a very minute *Acarus* issue from an apparently dead larva of a *Xenos*, and which was quite unlike any other of the *Acaridæ*, of which he has also made a very extensive investigation. Subsequently, Mr. Pickering, who it will be remembered exhibited some stylopized bees at the April meeting of the Society, informed me shortly afterwards that his larvæ had produced a number of minute *Acari*, which he gave me for examination, and which he had placed in spirits of wine, in which they were so minute as to be scarcely visible even with a common $1\frac{1}{2}$ inch-focussed lens.

My own bees, however, afforded me but too many opportunities of examining this curious little animal in a living state; for I observed that the bees (which I kept in wide-mouthed bottles, feeding them with flowers and moistened lump-sugar, upon which they thrived well and were very active), from time to time, bent their abdomens downwards, applying them against the leaves of the flowers; and on examining the cause of this motion, I perceived that it was for the purpose of dislodging a number of minute creatures, similar to those which Mr. Pickering had given me, and which were creeping about amongst the hairs at the extremity of the abdomen; and which, with a strong lens, I saw

making their way through a transverse impression near the extremity of the upper side of the head of the larva of the *Stylops*. In this manner, every one of the many larvæ of the *Stylops* which I hoped to rear, perished. Anxious, however, to obtain more knowledge of this parasite, I opened the body of some of the bees which were thus attacked, so as to expose the moist and fleshy body of the larva of the *Stylops*, when I was surprised to find the latter filled with these parasites in a most extraordinary number; some, as though not sufficiently developed, lying in an arched position, and others, nearer the head of the larva, struggling towards the place of exit above mentioned. The transparent skin of the larva permitting them to be clearly visible, I do not hesitate in stating, that there must have been far beyond a hundred individuals in each larva. In examining the interior of the abdomen of one of the bees, from between the segments of which the heads of two *Stylops* larvæ were exserted, I found a third larva, similarly attached, but entirely hidden within the abdomen of the bee,—a fact of some interest towards the natural history of the *Stylops*. These parasites reminded me most strongly of the parasite of the bee, which Mr. Kirby has described under the name of *Pediculus melittæ*, and Dufour under that of *Triungulinus andrenetarum*. The body is long and flattened, rather narrowed towards the tail, which is furnished with two very long setæ; the head is semicircular and flat, with two dark patches at the posterior angles, of which, from the minute size of the animal, I could not ascertain the organization, but which evidently represent the eyes. For the same cause, I could not distinguish the structure of the antennæ and mouth. Indeed I doubt whether the former exist at all in the insect; the body is composed of thirteen segments, including the head, and excluding two small fleshy tubercles upon which the anal setæ are placed. The first segment of the body is transverse, and applied closely in front to the posterior part of the head, so as to appear a portion of it, but easily distinguished by the dark line of separation. The remaining segments are transverse, but gradually smaller and shorter; the posterior lateral angles of each being terminated by several short setæ. The legs are six in number, about as long as the breadth of the body, and apparently composed of four pieces, the first short, and by which they are attached to the lateral under surface of the three anterior segments; the second short, and armed on its anterior margin with several short but strong spines, the third and fourth of nearly equal length, the terminal one being dilated and fleshy at the tip, and not provided

with any terminal unguis nor articulated. These creatures creep but slowly about the head of the larva, and amongst the hairs of the abdomen of the bee; and, when in motion, the legs have a peculiar mode of progression, the anterior pair being brought straight in front of the head, and parallel to each other, acting as, and apparently supplying, the place of antennæ. The following legs are then brought forwards over the anterior pair, and the third pair is then brought over the middle pair, as represented in the accompanying sketches. Two points of inquiry still remain. What are the habits of these animals? and to what class do they belong? and I must confess that upon both points I can form only vague conjectures.

The inquiry into its habits opens a very wide field for speculation. That an animal like this should have been enabled to obtain an admission, not in a single instance, but in every specimen of the larva of *Stylops* seen by Mr. Pickering or myself this spring, is a most curious circumstance. At what time were they deposited within the body of the *Stylops?* What will they now subsist upon? In what situation will they remain until they are again enabled to place the germs of their progeny in a similar situation in the body of the larvæ of the *Stylops?* I must confess I cannot offer any explanation of these inquiries, connected so closely as they are with the natural history of the *Stylops;* but I trust another year, and more leisure, may enable me to return to the subject.

As to the situation of these insects in our systems, its general appearance and habits have a certain resemblance with some of the immature *Acari*, which Duges has proved possess only six legs; and, indeed, the figure of the young *Acarien du galle de tilleul*, figured by this author in the Annales des Sc. Nat., second series, Vol. II. Plate II. A, has somewhat the appearance of this insect; but the articulated structure of the latter, and the structure of its legs, entirely remove it from the *Acaridæ*. How far we may be right in referring it to the Ametabolous order, *Anoplura*, I will not pretend to decide; but unless it be a larva of some hexapod insect, I must confess that I know not where else to place it.

But the idea suggested itself to my mind that there was a much greater resemblance between this insect and the animal which is often found upon bees, and which has given rise to so much discussion, having been so often bred from the eggs of *Meloe proscarabæus*. It is now generally admitted that they are the young of that insect, notwithstanding their great dis-

similarity of structure and habits, but which having crept upon the bodies of bees, are then supposed to be carried into the nests of those insects, where they grow, and at length appear as perfect *Meloes*. No one, it is admitted, has ever seen the larva of *Meloe*, except as one of these minute *Pediculi melittæ*, as Kirby calls them; and I have elsewhere said that, notwithstanding all the apparent proofs of their being the larvæ of the *Meloe*, I cannot but think them in some unaccountable manner or other to be parasites, not only upon the bees, but also within the eggs of the *Meloe*. It is true many observers have seen them hatch from the eggs of the *Meloe;* it is just as true that every larva of the *Stylops* observed by Mr. Pickering and myself this year, produced the little creatures above described, yet I should be very fearful of asserting that the latter is the young of the *Stylops;** and yet, if such were really the case, it would not be more extraordinary than is the mode of production of the *Coccus*, or the fact that the *Pediculus melittæ* is the young of the *Meloe*. If, again, (and there are so many characters in common between the two insects, that I am almost warranted in making such a suggestion,) the minute *Stylops* parasite be the younger state of the *Pedieulus melittæ*, we should have an extraordinary fact, but one which the development of the *Stylops* parasite by no means would lead us to regard with additional surprise. There is also another fact relative to the *Pedieulus melittæ*, which appears to be overlooked, namely, that it does not confine itself to bees, but is found upon *Tenthridinidæ* and other *Hymenoptera*, as well as upon *Diptera*. Its object, therefore, in mounting upon these insects, is not for the purpose of being carried into the nests of the bees as some authors have supposed. The general structure of the *Pedieulus melittæ* has been observed by Kirby, De Geer, Dufour, and others; but none of these authors have ever thought of examining the structure of the mouth of these insects. On carefully examining one of these insects captured upon a *Tenthredo*, I ascertained that its mouth is strictly mandibulated, and composed of the following organs: a pair of long acute and slender horny mandibles broad at the base, and rather impressed about the middle, folding upon each other like the jaws of a larva of *Dyticus;* a pair of three-jointed maxillary palpi, having the two basal joints minute, and the terminal joint long and cylindric, arising from a broad mem-

* What are the females of *Stylops*? Is it possible that, like the females of *Psyche*, they do not leave their larva-abode, but retain their larva-form? In such case the individuals producing these minute parasites may be females, and the parasites their young.

branous plate having apparently no distinct motion, but being connected with a central plate, from the anterior margin of which arises a pair of very minute two-jointed palpi, the terminal joint being rather the longer and more slender of the two. I cannot perceive any distinct upper lip. Now this organization is very similar to that of the mouth of many *Coleopterous* larvæ; but, at the same time, it is equally analogous to the structure of the trophi of the mandibulated *Anoplura*, at least in the very few which I have examined and dissected; so that, in this respect, we have not made much way towards the solution of the question. This structure was observed, as I have said, in a specimen taken at large, and not in one actually reared from the eggs of the *Meloe;* but by the kindness of the Rev. L. Jenyns I have been enabled to make a similar investigation of the animals produced from the larvæ of the *Meloe*, and I find them identical.

Plate XV. Fig. 13. Head of the larva of *Stylops* exserted between the abdominal segments of an *Andrena* with the parasites emerging from the front of the head, and creeping amongst the hairs of the bee; 13 *a*, the parasite greatly magnified; 13 *b*, *b**. *b***, the parasites with the legs in different positions; 13 *c*, one of the legs; 13 *d*, *e*, *f*, terminal joints of the leg in different positions; 13 *g*, the larva of *Stylops*, with the parasites visible through its skin.

Fig. 14. The reputed larva of *Meloe* highly magnified; 14 *a*, underside of the head; 14 *b*, parts of the mouth detached; 14 *c*, side of the head; 14 *d*, eye; 14 *e*, mandible; 14 *f*, maxilla.

XXXV. *Descriptions of some New Species of Exotic Insects.* *By* G. R. Waterhouse, Esq., *M.E.S., Curator of the Zoological Society.*

[Read 5th December, 1836.]

I beg leave to lay before the Society the descriptions of some interesting forms of insects, constituting part of the collection brought to this country by C. Darwin, Esq. who has lately returned after an absence of five years, which time has been spent in collecting these and other objects of natural history, in various parts of the world.

Some time since, about January, 1835, I had collected together a number of specimens of insects to illustrate certain views relating to the analogies observable amongst them. I was however obliged very suddenly to leave London, and hence had not an opportunity of exhibiting them to the Entomological Society as I intended,—and thinking that I might not again be able to collect

so interesting a series, I requested our Secretary to place them before the next meeting; as however I wished him to make a few remarks upon them, explanatory of my views, he (as I have since thought very properly) declined doing the latter,* as there was a risk of his not having clearly understood my meaning. I had no time to put my remarks upon paper; the insects were therefore returned to the friends who had been so kind as to lend them to me. I may remark that the greater portion of them were from the collection of our liberal president, the Rev. F. W. Hope.

This collection consisted chiefly of Coleopterous insects, and among them I had most of the more curious *forms* observed in the section *Heteromera*,—my object being to show that the species thus selected were analogous representations of other groups of beetles; that is to say, that they departed from their own group in certain characters of form, colour, &c., and that in these respects they appeared to have borrowed (if we may use such a term) the characters of other groups of the same order, to which they bear such a resemblance that they might at first sight be mistaken for species belonging to those groups; and we often observe that the markings vary according to the habits of the individuals.

Let us take the genus *Colymbetes*, for instance. We find that for the most part those species which live in stagnant waters are immaculate, whilst those which live in running streams are spotted. Now although in these instances we may be willing to allow that the markings are connected with the habits, yet we are not aware for what reason.

Considering, therefore, that we are comparatively ignorant of the connection between the habits and structure of insects, beyond that it exists; in talking of the analogy which is found between two insects, as before stated, I allude only to a resemblance of form or in colour.

Whilst examining various collections of insects, at first when I perceived these resemblances I was inclined to believe that there existed a positive affinity between certain species of one group and those of several other groups; *i. e.* that each group not only possessed affinities to that immediately preceding and the one following, but that it possessed affinities to *many* other groups. I however found that I never could trace a positive linking of one group to more than two others,—that which preceded it and that which followed. I therefore felt compelled to give up my theory, which I afterwards had approached to one already made known—

* The series was exhibited at the meeting of the Entomological Society on the 2nd February, 1835. See Journal of Proceedings.

I mean the "*net-work theory*," as I have heard it termed. I perceived that these supposed affinities were in fact analogies. My next step was to make notes of these various analogies as I went through each group, and in so doing I found, as I thought, that each group preserved analogous representations to all other groups which are of equal value, and of the same greater section. For instance, I found analogies in one section of the *Coleoptera* to almost every other section of equal value, and I perceived that in the *order Coleoptera* there were analogous representations to almost nearly all the other *orders* of insects; and through the kindness of my friends I found no difficulty in collecting together, as before stated, a series of specimens to exhibit to the Society in illustration of these views.

In studying other branches of natural history I have found no reason to abandon these views; on the contrary, they seem to be confirmed. They have therefore been brought before the Society in the hopes of calling attention to the subject, as I think it one of great importance, and may go a great way to prove or disprove an exceedingly ingenious and favourite theory—I mean the circular and quinary system; for it may happen that in the formation of this theory analogies may in some instances have been mistaken for affinities. Before I conclude these remarks I will merely observe, that there appears to me to be three circumstances, each of which may give an appearance of correctness to the theory of the circular arrangement of animals, and yet that idea may still be erroneous.

In the first place, a group may be so arranged that the last species may be an analogous representation of the first, and if this be looked upon as an affinity, it might then be said that the last, possessing an affinity with the first, the group could only be arranged naturally by placing the species in a circular manner.

Again, it may so happen that certain species are removed from their natural affinities and wrongly placed, but so disposed that they possess an affinity to the first; here again, not to destroy this affinity, we must arrange the species in a circle.

The third case is this—supposing a certain series of species follow in succession according to their affinities, and we will imagine them to be placed in a straight line; now in the middle of this line there may be a species which bears an analogous representation to the group which commences the series; if this species, together with a few others immediately allied, be removed from their natural situation, and placed at the end of the line, and the case of analogy be called an affinity, the natural way to arrange

them would appear to be in a circle, that the supposed affinity in the last species to the first may not be violated.

These three cases may appear preposterous; but let us take into consideration the number of different arrangements proposed for this tribe of animals, and we must conclude that it is far from a difficult matter to be deceived in cases of affinity and analogy.

My aim in making these remarks is to gain information, for I have one good reason for believing them incorrect, and that is, that I *know* others better informed than myself do not agree with me in opinion; I shall therefore have the benefit of their views if the matter be discussed.

Four of the insects here described are remarkable for their resemblance to species of distinct groups; the first (*Belus testaccus*) is one of the *Curculionidæ*, and belongs to Schönherr's section *Orthoceri;* yet in its elongate form, and pointed elytra, it would appear to be a species of the genus *Lixus*, which genus belongs, as is well known, to a different section.

The insect described under the name of *Leptosomus acuminatus* is another instance of the same nature; here we have one of the true *Curculionidæ* representing the *Brentidæ*.

Our next insect is the *Allelidea Ctenostomoides*. This little beetle is evidently allied to the genus *Dasytes;* it nevertheless so closely resembles in form, colouring, and sculpture, a species of the genus *Ctenostoma*, among the *Cicindelidæ*, that at first sight I thought it might be one of that genus.

The last is perhaps one of the most remarkable instances. This is one of the *Chaleididæ*, in which the thorax is produced posteriorly into two processes, like the elytra of a Coleopterous insect (and they appear to answer the same purpose); and so strong is the case of analogy, that when viewed only from above, the insect might be mistaken for a species of the genus *Mordella*.

Now it may be said that it is nothing remarkable, supposing the same end to be gained, that the same means should be used; if it be fitted in one instance it would also be fitted in another. Nevertheless it is worthy of observation in many points of view. By observing these facts we often perceive that two individuals of distinct groups have habits in some respects similar, and the result is, that there is also a similarity in their form, sculpture, and colour, —here there is a step towards the discovery of the uses of these characters.*

* Why should species of one group possess nearly the same habits as those of another, when in this respect they differ from the generality of the species of their own section?

Order COLEOPTERA.

Section Rhyncophora.

Genus Belus, *Schonh.*

Belus testaceus.

B. ater ; supra crebrè punctatus ; thorace, elytris, pedibusque testaceis ; tarsis nigris, rostro gracile, subelongato at leviter curvato ; capite fere thoracem longitudine, equante ; thorace brevi, sulco dorsali obscurè impresso, cylindraceo ; elytris linearibus elongatis, latitudinem thoracis æquantibus, et ad apicem cuspidatis.

Long. corp. 4 lin.

Hab. in Australasia.

Obs.—This species, which was found near King George's Sound, appears to have all the principal characters of the genus to which I have referred it. The antennæ, if bent backwards, would extend considerably beyond the base of the thorax; they have the six basal joints long and slender, and the five following incrassated ; the terminal joint is rather longer than the preceding, and pointed at the apex. The eyes are large. The head and thorax are very thickly punctured, the punctures are confluent; there is a shallow fovea on the former between the eyes, and the latter has an indistinct dorsal channel. The elytra are also very thickly punctured, the punctures are confluent, and have an obscure indication of being arranged in longitudinal striæ. The four posterior femora are pitchy-red, and the apex of the anterior tibiæ is blackish.

Curculionidæ.

Leptosomus acuminatus, L. (Plate XVII. fig. 2.)

This insect is described by Fabricius (*Syst. El.* 2, p. 535,) under the name of *Curculio acuminatus*, and, according to Schönherr, it constitutes the genus *Leptosomus*.

The latter author, however, appears not to have had an opportunity of examining the insect, since he quotes its characters from another work. As it is a very interesting genus, and some of its characters appear not to be known, perhaps I may be excused for adding those characters.

As regards the genus, the additional characters are as follows : Antennæ inserted near the apex of the rostrum : funiculus about equal in length to the scapus, seven-jointed ; the first coarctate, longer than broad ; the five following equal, rather short; the seventh subobconic ; club indistinctly three-jointed, ovate, acuminate. (Pl. XVII. fig. 2 *a*.)

L. acuminatus.

Obs.—A specimen of this insect, which is said to have been named by Fabricius, has been kindly lent me by the Rev. F. W. Hope; its specific characters are as follows:—

L. pitchy-red; head pitchy-black, nearly cylindrical, about equal in length to the thorax; coarsely punctured before the eyes, the punctures confluent; transversely furrowed on the posterior part; a large shallow fovea between the eyes. Thorax pitchy-red, elongate, nearly cylindrical, slightly narrower in the middle; coarsely punctured anteriorly, the punctures confluent; transversely furrowed posteriorly. Elytra about equal in length to the head and thorax, and rather broader than the latter; pitchy-red, with an oblique pale spot on each side near the middle; coarsely punctate-striated; apical spines black. Antennæ and legs reddish.

It will be seen upon comparing this description with that of Fabricius, that several points have been omitted by the latter; the sculpturing is not detailed, and the oblique pale spots on the elytra are altogether unnoticed—these spots consist of pale yellowish scales. The species is said to inhabit New Zealand; the specimen in Mr. Darwin's collection was found near Sydney, and differs in being of a smaller size, of a more elongate and narrower form. The puncturing on the head and thorax is indistinct; the former is black, and the thorax and elytra are nearly red, the latter is blackish towards the outer margins; on each side there is an irregular patch of gold-coloured scales, and between this and the suture there is another of a smaller size; these patches form an interrupted fascia, situated rather anterior to the middle part of the elytra.

Notwithstanding the difference of form and sculpturing combined with the different locality, I am loth to pronounce this a distinct species upon the examination of a single individual. The above remarks, together with an outline figure of Mr. Darwin's specimen, will, however, I hope, enable those who may possess specimens, or hereafter find other species, either to identify them with the Fabrician species, or point out their distinctions.

MELYRIDÆ.

Genus ALLELIDEA. (Pl. XVII. fig. 1.)

Labrum transversum, anticè rotundatum (fig. 1 *a*, front of head). *Antennæ* breves, 11-articulatæ; articulis tribus ultimis crassioribus (1 *e*). *Mandibulæ* bidentatæ (1 *b*). *Palpi-maxillares* tri-articulati; articulis ultimis obconicis (1 *c*). *Labium* bifi-

dum. *Palpi-labiales* 3-articulati, articulo terminali securiformi (1 *d*). *Thorax* subcylindraceus. *Elytra* linearia, elongata. *Tarsi* articulis intermediis obcordatis (1 *f*).

Allelidea Ctenostomoides.

A. æneo-nigra, capite thoraceque punctulatissimis; elytris punctato-striatis, fasciâ mediâ nec non maculâ ad basin, alterâque ad apicem, sub-flavescentibus, labio testaceo: antennis testaceis, ad apicem piceis; tarsis, femorumque basi pallidioribus.

Long. corp. $2\frac{1}{3}$ lin.

Hab. in Australasia.

Obs.—This genus is allied to *Dasytes*.

Order HOMOPTERA.

Genus Alleloplasis. (Pl. XVII. fig. 4.)

Antennæ tri-articulatæ; articulis duabus basalibus magnis, harum primâ brevissimâ, secundâ longitudine latitudinem excellente, tertiâ minutâ, orbiculari, setâ terminali (fig. 4 *e*). *Alæ* duæ, elongatæ, graciles; nervulo medio per totam uniuscujusque longitudinem excurrente, ramusculis obliquis ad latera divergentibus (4 *f*). *Tarsi* tri-articulati (4 *g*, *h*).

Alleloplasis Darwinii.

Descrip. Pitchy-brown; under part of the thorax pale testaceous. Abdomen black, with two white spots at the base on each side; above brown; beneath pale testaceous; the sides with two oblique white bands, each with a series of black spots. Wings spotted alternately with black and white. Legs pitchy-testaceous.

Length $1\frac{1}{2}$ lin.; wings included $2\frac{1}{3}$ lin.

Hab. in Australasia.

Obs.—This extraordinary insect was discovered by C. Darwin, Esq. whilst "sweeping in coarse grass and brushwood; King George's Sound." I have therefore named it after this gentleman, who has done so much towards the advancement of science, and to whom Entomology owes so much, since he has brought to this country an immense collection of insects from various parts of the world, and particularly of the minute species which had been comparatively neglected.

Plate XVII. Fig. 4. The insect seen sideways; 4 *a*, the same seen from above; 4 *b*, ditto, with the wings removed; 4 *c*, front of head; 4 *d*, promuscis; 4 *e*, eye and antenna; 4 *f*, wing; 4 *g* and 4 *h*, apex of tibiæ and tarsi.

Genus Cephalelus, Percheron.

This genus was characterized by M. Percheron in Guérin's *Magasin de Zoologie*, and as it was founded upon a single species, it is not remarkable that his definition is in one point too close to admit of some other species which evidently belong to the same natural group. I allude to the comparative length of the elytra: these in the species described by M. Percheron are shorter than the abdomen; he has therefore inserted this character into the definition of the genus, whereas it would appear from the circumstance of my possessing two new species in which the elytra are longer than the abdomen, it ought rather to be looked upon as a specific character.

Cephalelus marginatus.

C. pale brown. Elytra with the outer margin pale yellow, joined internally by a long blackish streak. Head much elongated anteriorly, and produced almost to a point.

Long. corp. 4—6¼ lin.

Var. β dark brown. Elytra inclining to black towards the outer margin; the margins pale testaceous.

Var. γ uniform pale brown.

Hab. King George's Sound.

Cephalelus brunneus.

C. pale brown. Head with anterior produced part rather broad and rounded.

Long. corp. 5—5½ lin.

Hab. near Sydney.

Obs.—These insects appear to vary much in size. I have examined several specimens of each of the species here described, and find that the most ready character for distinguishing them consists in the form of the anterior produced part of the head. In *C. marginatus* this portion is narrower, and consequently more pointed at the apex. In following the outline from the eye to the apex of the process, the line bends slightly inwards, so that towards the apex the two sides are nearly parallel. Then if we take a transverse section of this part of the head, we shall find the outline forms almost an oval but flatted beneath.

In *C. brunneus*, if we take the same section, we find the outline rounded above and concave beneath, nearly resembling the form of the new moon. In following the outline from the eye to the apex of the anterior portion of the head, the line is straight on each side, but converging gradually towards the apex, which part is rounded and broader than in *C. marginatus*.

Order HYMENOPTERA.

Genus Thoracantha, Latr.

Thoracantha Latreillii. (Pl. XVII. fig. 3.)

T. atro-cærulea, antennis piceis, ad apicem testaceis, decem-articulatis; pedibus pallidè testaceis: thorace posticè producto et in duas prolationes diviso (elytra *Coleopterorum* fingentes) ad apicem abdominis extensas: capite et thorace antico sulculis notatis, his sulculis similibus segmentis cyclorum circa centrum unicum prope basin antennarum.

Long. corp. $1\frac{3}{4}$ lin.

The insect here described appears to be identical with one figured in Guérin's *Iconographie du Règne Animal*, but as there is as yet no description, it appeared desirable that so remarkable an insect should be better known; I therefore lay before the Society an outline drawing, and exhibit a specimen. It is of course described under Guérin's name, but should the *species* be distinct (for I think there can be no doubt as to the genus) I would propose the specific name of *Coleopteroides*, since this insect so remarkably resembles one of that tribe; viewed from above it resembles a species of *Mordella*. It has literally elytra or *wing-cases*, although they are not analogous to the members so called in Coleopterous insects.

From Bahia.

Plate XVII. Fig. 3. The insect seen from above; 3 *a*, ditto seen sideways; 3 *b*, front of head and thorax; 3 *d*, fore-wing; 3 *e*, antenna.

XXXVI. *Observations upon the* Chigoe, *or* Pulex Penetrans. *By* W. Sells, Esq.

[Read 1st May, 1837.]

Most persons who have been resident for any length of time in Jamaica, especially in the interior of the island, have experienced the attacks of this tiny tormenter, and can tell what it is to have a *Chigoe*. In the first instance of its occurrence, the newly arrived emigrant, being without previous experience, is at a loss how to account for a slight itching, or sort of tickling sensation, in one or other of his toes, and which he instinctively seeks to alleviate by rubbing the part smartly—this he repeats again and again, but alas! to no good purpose. At length, the itching increases to posi-

tive uneasiness, and then to pain; he is now induced to examine his toe, and finds it red and swelled—the part affected is most commonly near the nail. Upon careful inspection a point is visible in the cuticle where the enemy made good its lodgment; a servant is now commonly consulted, who tells him it is a *Chigoe*, and that it can easily be pulled (as the term is) either then, or in a day or two, when it will be in a better state to ensure a successful operation. The latter is effected by means of a fine needle, the point of which is used to dissect the skin back slowly and cautiously, and thus gradually expose what is called the bag, but which in reality is the enlarged abdomen of the female distended with ova, and which may be considered in some measure analogous to the pregnant female termites. The operator (who is almost always a female) then dexterously separates the bag from its slight surrounding adhesions, and turns it out whole, being of a rounded form, and in size of a small tare; the hollow (which resembles the pea-hole of an issue in miniature) is, by the white people, commonly filled with a drop or two of laudanum, and by the negroes, either with bruised green tobacco leaves, tobacco ashes, or snuff, and usually heals very quickly, without giving any further trouble; but every now and then, either from want of skill in the operator, restlessness of the patient, the inaccessible situation of the *Chigoe*, or other cause, the bag (say abdomen) is ruptured, and some of the embryo progeny are left behind; in this case considerable mischief frequently ensues, in the shape of inflammation and ulceration, and we have what the natives call, on account of its severity, '*a poison Chigoe.*'

White persons are seldom annoyed by *Chigoes,* their feet being protected by covering; but occasionally one is picked up when stepping upon the bed-room floor without stockings. As regards my personal acquaintance with them, although I may truly say of a large proportion of the evils and maladies incidental to Europeans who have been long resident in the West Indies, "dolor me facit experientiam,"—I have but little to lay to the account of the *Chigoe*, as during a twenty years' sojourn there I did not experience more than four or five attacks from it, and having an expert Chigoe-picker among my servants, the operation was always performed in good time, and never caused me any pain or inconvenience whatever. However, in the course of my medical practice, I have seen perhaps a dozen cases where white persons either from inattention, or an inflammatory habit, have suffered much for weeks together from the effects of a *Chigoe.*

The negroes, whose feet go naked, are consequently much ex-

posed to the invasion of *Chigoes*, and instances are quite common where, at one sitting, ten or twenty have been extracted from the toes and sides of the feet. I have known several cases in which, owing to long continued neglect, extensive swelling and inflammation have supervened, followed by much ulceration; and in bad habits of body, even by the loss of one or more joints of the toes. Sometimes the hands are affected, and, though more rarely, the face, when the sufferer presents a hideous and disgusting appearance, being then, as the phrase was, 'eaten up with *Chigoes*.'

Chigoes abound particularly in hen-houses, and in the dust of the dry coffee-pulp.

Dogs and pigs not uncommonly suffer from *Chigoes;* the poor dog will nibble and lick his paw most perseveringly to rid himself of his tormenters, but very often in vain, and will then proclaim his trouble by whining piteously, and thus often excites the compassion of his master, who summons some one to relieve him 'secundum artem.'

The only notices appertaining to this insect which my books afford me are in *Rees' Cyclopædia*, and in *Ulloa's Voyage to South America*. The former, under the article *Pulex—P. Penetrans*, describes the *Chigoe* as "having a proboscis as long as the body, which latter is reddish brown; the abdomen of the gravid female is orbicular and swollen to 100 times its natural size." Ulloa says, "the insect of Carthagena called *Nigua*, and in Peru *Pique*, is shaped like a flea, but almost too small for sight;" it takes its lodging in the true skin, where "it forms a nidus or nest covered with a white and fine tegument resembling a flat pearl, and the insect is, as it were, inchased in one of its faces, with its head and feet outwards, for the convenience of feeding, while the hinder part of the body is within the tunic."—*Ulloa's Voyage*, vol. i. p. 65.

The specimens sent herewith were imported by me last year from Jamaica; two of them appear very fresh and perfect, as though they had been removed skilfully, and directly put in spirits; the others were probably moistened with blood during extraction, and thus became discoloured.

XL. *On the Characters of the* Chigoe *or* Jigger. *By* J. O. Westwood, *F.L.S. &c.*

[Read 1st May, 1837.]

Mr. Sells having been so kind as to place in my hands the specimens of the jigger which he had received in spirits from Jamaica, I have been enabled to make a minute investigation of several of its characters, with the view of clearing up some of the points concerning its structure and economy, which still remain subjects of doubt.

Much uncertainty has prevailed relative to the tribe of insects to which the jigger belongs. Linnæus named it *Pulex penetrans*, but with these observations—"An Catesbæi *Pulex*, Brownii *Acarus*, Rolandri *Pediculus ricinoides* verè specie differant? an *Acarus*, *Pediculus*, *Pulex*? Catesbæus suum delineat cum furca *Podurœ*. Brown sui adscribit pedes octo *Acari*. Rolander vero pedes tantum sex *Pulicis* saltatorios, ut in vero pulice, sed *Phalangium cancroides* nostras etiam corpus eodem modo intrat et dolorificum inhabitat; dijudicent itaque Americani cujus sit generis et utrum una aut plures species."—*Syst. Nat.* ii. p. 1022. Latreille, also, in his *Histoire Naturelle*, regarded it as belonging to the genus *Acarus* (vol. vii. p. 390). And see also Oken in his *Lehrbuch der Naturgesehichte*, Jena, 1815, vol. iii. p. 402.

From the description and figure given by Swartz in the Transactions of the Royal Academy of Stockholm (Band ix. p. 40, pl. 23, f. 10); Kirby and Spence, vol. 4, pl. xxiii. f. 10, (which figure represents the abdomen of the insect of the ordinary size, and with the anus bifid); Dumeril, *Considerations Générales sur les Insectes*, pl. 53, f. 4, (which represents the insect with the abdomen of the ordinary size, but terminated by an elongated, slender, forked appendage like that of a *Podura*, and fig. 5, which represents the female with the large distended abdomen); and still more recently from the work of Pohl and Kollar (*Brasiliens vorzüglich lästige Insecten*, fig. 5); it is evident that the jigger belongs to the same tribe as the flea, and that there are two species of *Acaridæ* (*Ixodes Americanus* and *I. crenatus*), which are also obnoxious in tropical America.

The great length of the rostrum however, (which Linnæus correctly described as being "longitudine corporis,") together with the diversity in the habits of the insect, induced Latreille to observe that it "forme probablement un genre particulier," (*Règne Animal*, 2d edit. vol. v. p. 351); and the late Rev. L. Guilding,

in his unpublished MSS., accordingly raised this insect to the rank of a distinct genus, under the name of *Sarcophaga penetrans*.

From all the accounts published of the habits of this insect, it is evident that its natural and ordinary locality is hot and sandy ground, (indeed Pohl and Kollar call it the "Sandfloh") ; and that on extracting the jiggers from the human foot, they are found in no other state than that of having the abdomen immensely swollen, and filled with eggs, like the gravid queen of the *Termites*. Thus females only burrow into the feet ; and Messrs. Pohl and Kollar observe, that the front part of the body is turned inwards, whilst the anus is placed at the spot where the jigger entered into the flesh. Hence they suppose that it is only for the purpose of finding a more abundant nourishment for the developement of their eggs, that they burrow into the feet, adding, that "as, besides, no larvæ or maggots were found in the feet, but tolerably forward eggs at the orifice of the anus, it is probable that the female lays its eggs on the ground, where they transform themselves into larvæ, pupæ and perfect insects."

But this opinion seems to me to be completely disproved by the fact, that if the jigger be left to itself the most serious consequences follow, which must, I apprehend, be caused, not by the continued operations of the female (although from the immense number of her eggs, and the great diversity of size between those near the orifice and those at the other end of the egg-ducts, it is evident that a considerable time must be occupied in the deposition of the eggs), but by the workings of the young when hatched ; and this is further confirmed by the fact, that similar ill effects ensue when the jigger is not extracted entire, some of the embryos remaining in the wound. The observations also of M. Defrance, published in the *Encyclopédie Méthodique*, vol. x., upon the habits of the larvæ of the common *Pulex irritans*, also favour my view of the subject.

In like manner I cannot adopt the opinion of Dr. Rodschied (cited by Pohl and Kollar, from his work upon the Essequibo district), that the jigger lays no eggs, but that the larvæ are developed in the abdomen of the mother, and are there even transformed to pupæ. This, he says, can be distinctly observed if a sand-flea be extracted, which has nestled for some days ; its abdomen has then increased to the size of a pea, and one can clearly see the thorax as well as the proboscis and eyes. These little bodies, he adds, found thus swollen, may rather be taken for pupæ than for eggs, for they are too large to be the latter. He further thinks that the female of the sand-flea feeds, by suction, the larva

in her stomach, until it has reached maturity; when a perfect insect it may bite its way through, so that these insects may be classed amongst the viviparous.

It was with the view, therefore, of examining the correctness of these opinions, as well as investigating the grounds for the propriety of separating the jigger generically from the common flea, that I undertook the examination of Mr. Sells's specimens.

These individuals presented the ordinary swollen appearance described by most authors, but I was most surprised at the comparatively minute size of the exposed parts of the front of the body and limbs; these were placed in the centre of a membranous space somewhat like a reversed trilobed leaf, and within the thin skin of the abdomen at the broadest part of the circumference might plainly be perceived many oval bodies, which, on breaking the skin, proved to be ova inclosed in a membranous egg-duct, and placed end to end, the eggs at the other extremity of the egg-tubes being very minute and globular; the size of the oval eggs seemed very considerable compared with that of the insect itself. On opening one of these eggs, in order to ascertain whether the larva might not be enclosed therein, as would be the case were Dr. Rodschied's opinions correct, I found nothing but an immense number of exceedingly minute globular masses of different sizes, as represented in my figure. Now as these jiggers had in all probability been extracted at the time considered most fit to prevent the extension of the injury to the patient's foot by the deposition of the eggs within the wound, it seems to me evident that these large sized eggs were in a fit state for deposition, and that consequently the larvæ are not developed in the abdomen of the female like those of the *Hippoboscidæ*, but within the wound; the immense quantity of the eggs also is in opposition to such an opinion. If this be the case, the larvæ would continue to feed within the flesh, and they might either burrow out when full grown, or might undergo their transformations in the foot, escaping only when arrived at the perfect state. The circumstances connected with the wounds produced by the insect when left untouched have not been related; they would, of course, supply a solution to some of the questions respecting which we are still in doubt. But it must be evident that the ordinary habit of the jigger cannot, from its great numbers, be that of burrowing into the human foot.

On each side of the head is a black and circular space, evidently an eye, but appearing to be of a simple construction like an ocellus, and behind this is a space or impression, within which the antenna was evidently placed, but of which I was unable to

ascertain the structure. The six legs are formed like those of the common flea, the tarsi five-jointed and long, with long and simple ungues. The proboscis is very long, acute and horny, apparently composed of a single inarticulated piece; but on examining this, it divided into three pieces of horny texture, one very slender and rather curved at the tip, representing the tongue, and the two others identical in structure, flat, broader, less acute at the tip, with the sides obliquely channelled or guttered; these are the mandibles. Of the maxillæ, I could not discover any trace, although the maxillary palpi are very distinct and four-jointed, the second joint being the longest. Of the labium and labial palpi, which in *Pulex* are very conspicuous, I also obtained no other trace than a small and slender piece of membrane observed behind the tongue, and which I am by no means sure formed part of the mouth.* Thus it is evident that the elongation of the horny mandibles and tongue is obtained at the expense of the labium, labial palpi, and maxillæ. The basal joint of the legs is very large and plate-like as in *Pulex*, and the abdomen, when distended, exhibits no trace of articulation, being entirely membranous.

The insect figured by Kirby and Spence, as well as Dumeril's figure 4, may be supposed to be males, or perhaps rather females, not being in a state of gestation.

From analogy with such parasites as *Bopyrus Squillarum*, *Nicothoe Astaci*, &c., we may conjecture that the male when discovered will be of very minute size compared with its partner.

From these circumstances I think we are justified in adopting Mr. Guilding's views, in regarding the jigger as the type of a distinct genus, which may be thus characterized.

Sarcopsylla.†

Abdomen feminæ gravidæ maximum, globosum, membranaceum, ovis repletum, segmentis destitutum.

Rostrum (*rostrulum*, K.) valdè elongatum, corneum; mandibulis elongatis, compressis, lateribus serrulatis; linguâ elongatâ, corneâ, tenuissimâ; maxillis inconspicuis, palpis maxillaribus elongatis, 4-articulatis, frontalibus; labio, palpisque labialibus obsoletis?

Habitatio feminæ gravidæ (et, ut videtur, larvarum et puparum) intra pedes hominum, &c.

* Both Messrs. Dugès and Guérin have also detected this organ as forming part of the mouth, so that it must evidently represent the labium.

† The generic name *Sarcophaga* being already employed in the *Diptera*, that of *Sarcopsylla* may be suggested in its stead.

Species 1. *Sarcopsylla penetrans*, Linn. Bicho de Pé.

Plate XX. Fig. 3.

Fig. 3 *a*, female natural size; 3 *b*, ditto magnified, distended with eggs; 3 *c*, head and prothorax; 3 *d*, maxillary palpus; 3 *e e*, mandibles; 3 *f*, lingua; 3 *g*, labium? 3 *h*, one of the feet; 3 *i*, part of the coil of eggs; 3 *k*, ditto nearer to the anal orifice; 3 *l*, one of the eggs opened.

Species 2. *Sarcopsylla canis*, Westw. Bicho de Cachorro.

Differentiæ specificæ haud determinatæ.

Obs.—Since this memoir was read, M. Dugès has published a memoir on the *Jigger*, in the *Annales des Sciences Naturelles* for September, 1836, in which he has traced the organization of gravid females, but has not considered it proper to separate it generically from the genus *Pulex*. M. Guérin, also, in his *Iconographie du Règne Animal*, (Insectes, pl. 2), has given figures of the insect in various states. His figures 9 and 9 *a* represent a specimen with the abdomen of the ordinary small size, and terminated by a long furcate instrument, composed of five pieces (fig. 9 *f* and 9 *g*), and which in his descriptive text (for proof sheets of the first part of which I am indebted to him) he regards as a male, with exserted organs of generation, considering that the forked appendage cannot be an ovipositor, and consequently that the individual must be a male. His figure 9 *b* represents a female, with the abdomen distended as in my figure; and in his text he proposes the generic name of *Dermatophilus* for the insect.

XLI. *Description of a minute Crustaceous Animal from the Island of Mauritius.* *By* Robert Templeton, *Esq. R.A.*

[Read 4th April, 1836.]

Class CRUSTACEA, *Brisson. Lam.*

Sub-class Malacostraca, *Latreille.*

Order Amphipoda? *Latreille.*

Genus novum, Zeuxo.

Antennæ 4, breves, subæquales, spinis armatæ; superiores, 3-articulatæ, articulo 1mo multo majore; inferiores indivisæ, 5-articulatæ, articulo ultimo valdè minuto.

Oculi duo: antennis superioribus contigui, in squamis subtriangularis capite articulatis immersi.

Corpus elongatum, semicylindricum, segmentis 13 divisum; primum maximum, 11 et 12 valdè angusta. Cauda, aut corporis ultimum segmentum, mediocriter lata, setis duobus articulatis spinosis instructa.

Pedes 14: par primum, crassum, cheliferum, multo majus; paria sequentia elongata, subsimilia, unguiculata, ungue 2di paululùm attenuati paris, longiore.

Pedes natantes ut in *Squillis*, è segmentis 8, 9, 10 orientes.

Species unica. *Zeuxo Westwoodiana.*

Body greyish, a rhomboidal black macula between and behind the eyes; another very large, mottled interiorly, with the anterior side greatest, occupying nearly the posterior mesial half of the cephalic ring. The second ring with an elongate triangular dash on each side, the apices almost meeting in the centre. The succeeding rings with the sides mottled, and a rectangular black spot on the middle part of each posteriorly.

Length 0·14 inch.

Among marine plants near Black River, Mauritius.

The cephalic ring of this minute crustaceous animal is somewhat conic in its form, being considerably dilated posteriorly; it has a minute rostrum projecting between the superior antennæ, and a hollow on each side exterior to those antennæ, in which rests a small articulated plate, carrying the jet black apparently compound eye. The exterior surface of this minute plate is arched, and the eye seems immersed in it, or at least the membranous covering of the plate covers also the eye. The antennæ are four, rather more than half as long as the cephalic ring, subequal, the superior composed of three joints; the first of which is large and robust, spiny or hairy, dilated near its base, and arising from an excavation on each side of the rostrum, a little superior to the eye. The second joint is very small, a little longer than broad, and encircled at its extremity with a fringe of hairs; the third is minute, conical, the truncate extremity surmounted by four or five linear blunt styles, above which project a few long spines or hairs. The inferior antennæ are nearly as long as the superior, and arise immediately beneath the superior: they are five-jointed; the first joint short and rather thick; the second very short; third more slender and as long as the first, with a few long hairs descending from its apex; fourth joint much smaller than the last, but similar in form, and also armed with one or two long hairs; fifth joint excessively minute; its apex margined with blunt spines, from whose centre proceed three or four very long and acuminated spines or hairs.

From the cephalic ring behind, and from a slight eminence, arises the anterior leg, or arm, exceedingly robust, reaching to beyond the middle of the antennæ, cheliferous; its second joint projects like an elbow behind the apex of the first, which descends obliquely outwards, and is rounded, thick and short. The third joint is much smaller, irregularly triangular, and has the fourth articulated to it superiorly, the articulating surface looking also slightly forwards and inwards. The fourth joint is much the largest, thick and short, and carries the cheliferous joint. This latter is nearly of the same dimensions as that first described; it curves downwards about its middle nearly at right angles; the posterior part of the chela fixed, curved inwards, broad, with a blunt tooth at its extremity directed inwards, and rows of hairs along its edges; the anterior part is moveable, much narrower, and arched, so that its apex rests against the blunt tooth of the fixed part.

When one of these cheliferous legs is removed, there is exposed, included between them, the manducatory apparatus, consisting of a pair of mandibles ?, contiguous posteriorly, separated anteriorly; composed of four or five joints, becoming more and more flattened as they approach the apex, of irregular form; the last small, flat, curved inwards, its apex thickly fringed with elongate curved hairs, and arising from the extremity of a curved joint, to whose inferior surface is affixed a semicircular plate, the free edge of which is also closely fringed with hairs; these parts are kept by the animal in perpetual motion, most probably entangling the minute animals which served it for food.

Immediately above these appear a pair of maxillæ ? somewhat rhomboidal when looked at from above; the contiguous edges straight; the anterior irregular, with a few spines; exterior rounded, appearing as if articulated to one of the basal joints of the mandibles: the minute size and transparency, however, makes it impossible to ascertain exactly to which of them. They are also moved, but not with any thing like the velocity of the above described parts.

Above these, and with the fringed extremities reaching nearly to the end of the mandibles, are on each side two other elongate, biarticulate bodies (palpi ?), robust and rounded, whose extremities are fringed with short hairs; the hairs of the lower much less coarse and longer than those on the upper. When the tip of the upper is separated, it appears broad and hollowed, as if to receive the extremity of that adjoining inferior. Both lie in immediate proximity with a superior lip, whose extremity carries a minute palpiform process, directed somewhat backwards.

The next ring or neck is very short, and bears the second leg. This leg is slender, longer than any of the succeeding; the joints after the second being in succession, each longer than that preceding; spiny; the apex carrying a very long, gently curved claw.

The five succeeding rings are tolerably large, of nearly equal breadth, the central rather the longest, and each supporting a pair of legs, which are five-jointed; the second joint very long and thick, the rest about one half as long and spiny; the fourth and fifth toothed on the posterior edge, and the fifth carrying a short, strong, hooked claw. The rest of the rings are successively smaller, except the caudal, which extends a length equal to that of two which precede it; the first three are furnished with swimming feet, which are double jointed, the apical carrying two semicircular lamellæ, articulated by one extremity, the curved edges of which are furnished with very long hairs, and the straight edge of one with two blunt wavy spines. The caudal ring has a fissure on each side dividing its edge into three parts, the central terminated by a pencil of hairs, the lateral of each side with a seven-jointed style, whose first joint it conceals; the joints of these styles are elongate, and apically furnished with two or three spines or long hairs, those from the terminal very long.

This singular little animal, which I have inscribed to my friend Mr. Westwood, would seem to take precedence of all the genera in the division *Amphipoda* of Latreille, to which I believe it correctly belongs. It resembles, however, very much in its gait and habits the *Squillæ*, and the resemblance is still more striking, from the excessive developement of the hand, and the mode in which it is carried, pressed close up against the cephalic ring; and also in the form of the swimming feet. Nevertheless the chelæ, the simply clawed feet, the styled tail, subpedunculate eye, and the mode of origin of the antennæ, reduce it to its proper place among the *Gammaridæ*, but in a section distinct from any as yet described, [and nearly allied to *Tanais* and *Rhœa* of M. Edwards.—J. O. W.]

DESCRIPTION OF THE FIGURES.

Plate XVIII.

Fig. 1. *Zenxo Westwoodiana* considerably magnified.

2. Anterior part of the cephalic ring, exhibiting the eyes and mode of origin of the superior antennæ.

3. The same seen laterally.

4. The cephalic ring, with one of the hands removed to show the positions occupied by the parts of the mouth when in situ; *f*, the upper lip carrying the minute process.

Fig. 5. Tip of the superior antenna.
6. Tip of the inferior.
7. The exterior of the first pair of legs or arms.
8. The inner surface of the first legs.
9. The manducatory apparatus detached; *a*, the mandibles?; *b*, the maxillæ?; *c*, *d*, palpi?; *d* *, apex of the superior seen from below; *e*, part of the upper lip in situ carrying the minute palpiform process.
10. The mandibles? and maxillæ? from above; *n*, the penultimate joint.
11. The same from beneath; *m*, the lamella attached to the inferior surface of the penultimate joint *n*, fig. 10.
12. The same seen from inside.
13. The second pair of legs.
14. The third pair of legs.
15. Last joint of the swimming feet.
16. The apex of the caudal ring with the style.
17. The joint of the style which is concealed with the lateral part of the caudal ring.

Obs.—The organs on one side of the animal alone are delineated, in order to prevent confusion.

XLII. *Notes respecting the Nest of* Cteniza nidulans. *By* W. Sells, *Esq.*

[Read 2d January, 1837.]

Having received from the island of Jamaica at different times, in the course of the last twelve years, a number of the nests of *Cteniza nidulans*, with many specimens of the ingenious artisans which construct and inhabit them, I have been afforded favourable opportunities for making observations upon this curious and interesting structure, and which we may rank among the chef-d'œuvres of insect architecture. Those remarks are now brought together, and, with some sketches of the nest and insect, are submitted to the notice of the Society.

Large districts of the central parts of Jamaica, in which island I resided above twenty years, consist of a reddish argillaceous earth upon a limestone honey-comb rock, and the country is so hilly as to be termed mountainous; the red dirt, as it is commonly called, occupies the vallies, and more scantily covers the hills, where it is mixed with vegetable mould and nodules of the rock; the latter is in vast masses, and sometimes appears in large isolated portions, with perpendicular surfaces of from ten to thirty feet square; its cellular formation denotes its igneous origin, and

leads one to assent to Dr. Pinckard's opinion, that the West India islands are the products of a "vehement vomiting of volcanic explosion." The red soil is well adapted to the cultivation of coffee.

The *Cteniza nidulans* selects for the scene of its labours some spot under the rocks or trees in a sheltered situation, and where the soil is not exposed to the effects of the extremes of heat and moisture.

As from the want of the necessary care when digging out the nests by the rude hands commonly employed for the purpose, they are almost always so mutilated and torn as to preclude in a great measure our recognizing what is their actual shape in a perfect state, I, some years back, requested an old friend of mine to employ an intelligent person to obtain some specimens for me; my request was kindly acceded to, and consequently my next remittance contained, among others, two which were enclosed in large masses of the red dirt, one of which afforded a complete nest. In order to extricate it uninjured from its covering of earth, I filled the interior with melted wax, then immersed the mass in water for some hours, and afterwards divested it carefully of all the adherent earthy matter, and thus obtained the beautiful specimen, a drawing of which accompanies this paper. Never having seen any but finished nests before, to my agreeable surprise the other mass enclosed one in progress of formation, only the lid, neck, and about two inches and a half of the tube having been formed: the latter was of course quite open at the bottom. This specimen is an illustrative proof that the insect first forms the lid and neck of the nest, and then continues its substructural works, in the course of which some ounces of soil must be excavated and carried out. The remarkably robust and compact make of this spider is well adapted to its business as a miner. The delicate texture and unfinished state of the specimen in progress reminds one of the skeletons of houses which require to be plastered and lined, in order to strengthen and finish them before they are fit to be inhabited.

The nests I have received, about fifteen in number, several of which contained the dead insect, vary considerably in size, the smallest being scarcely five inches long, and the largest near nine inches; the diameter of the tube also varies from three quarters of an inch to one inch and a quarter, the aperture and neck being the widest parts; the outer layers of webbing are in every instance deeply coloured by the soil, and even the lining is slightly tinged of the same hue; the texture of the latter is beautifully fine, smooth, soft and silky; the body of the nest, which includes

about two-thirds of the whole length, is chiefly formed of two stout coats, each composed of numerous fine layers of webbing, but the entire thickness does not exceed that of strong cartridge paper. Those parts of its dwelling which would be liable to be injured by the effects of weather, pressure of the surrounding earth, or from the assaults of enemies, the insect forms particularly strong; as the lid, the neck of the tube, and the convex upper surface of the curved portion at the bottom, while all the remainder is comparatively very thin. The lid and the parietes of the neck for an inch from the aperture are at least an eighth of an inch in thickness, and have strata of the red dirt interposed between the layers of webbing, below which the latter becomes gradually thinner. It is remarkable that the strength bestowed upon the surface at the lower end, serves the important purpose of protecting the nest and its tenants from the downward pressure of the soil.

Those parts of this ingeniously contrived fabric which more strikingly call for our particular admiration are, the *lid*, and a *valvular apparatus* that is found inside, and immediately below the hinge.

The *Lid* bears some analogy to the upper shell of the oyster, inasmuch that the upper surface of it is rough, laminated, thick and strong near the hinge, and becomes gradually thinner towards the surrounding edges. The elastic force with which the lid, upon being opened, closes of itself, is principally accomplished by a fold or duplicature of the webbing at each end or angle of the hinge, so that upon raising the lid, which cannot be done without violence much beyond a right angle with the aperture, this fold is also opened, and the threads of the webbing are put upon the stretch in proportion to the extent to which the lid is elevated, and which, doubtless, in its proper use, by its lawful owner, never exceeds the insect's requirements.

The internal under-side of the lid is exceedingly firm and smooth, which contributes, in connection with the prominent convex form, and highly polished surface, of the thorax of the spider, to diminish friction and resistance as much as possible, and thus to facilitate at all times the expeditious exit and entrance of the insect.

Valvular apparatus.—About two months since I obtained a supply of four fresh nests, and, being tolerably well stocked before, I could afford to open them longitudinally, in order to examine their internal structure. One of them had no appearance whatever of any valves, but the other exhibited a beautiful instance of two regularly formed ones; one placed immediately be-

neath the hinge, and the other about three quarters of an inch lower down. At the moment, I conceived this to be the first discovery of the fact, but have since been informed that it has been spoken of by Mr. Kirby, although I have not succeeded in finding his notice of it. Now it is highly improbable that so complex an additional apparatus should be without its appropriate use; and yet, one nest has not the least vestige of it; therefore, in that case, it may be confidently presumed that it was not required. In order to explain this diversity of structure, the following suggestions have occurred to me as a plausible mode of accounting for it. In newly constructed nests the reacting elastic power of the hinge may be all-sufficient, and continue so for a considerable time; but from long continued use, the effect of weather, or other incidental causes, it may lose its spring, when the superadded construction of the valves may effectually restore its efficiency; as it is evident, upon close inspection, that the opening of the lid acts first upon the upper one, the decussating fibres of the crura of the upper valve act upon the lower one, which again sends out numerous elastic threads downwards. If this explanation be correct, it is calculated to double our admiration of this creature's workmanship, proving as it does that the great Architect of all has gifted this interesting insect with such a measure of accommodating instinct.

PLATE XIX.

Fig. 1. View of the interior of the upper part of the nest; *a*, the lid raised and kept back by a needle.
2. View of the interior of a section of the lower end of the nest; *a*, shows the cut surface of the thickened portion.
3. Upper surface of the lid; *a a*, angles of the hinge.
4. Section showing the internal structure; *a*, under-surface of the lid; *b b*, the cut surfaces of the upper portion of the nest, showing its great thickness and strength; *c*, the upper valve and the lower valve.
5. A perfect nest as preserved by injecting it with wax.
6. Specimen of *Cteniza nidulans*.
7. Internal view of the left mandible.
8. External view of the right mandible.
9. Magnified view of the eyes and the tuft of strong bristly hairs in front of the thorax.

XLIII. *On some Doubts respecting the Œconomy of Ants.* *By the* Rev. F. W. Hope.

[Read 7th February, 1837.]

The word which in our translation of the Bible is termed "Ant," is in Hebrew called *Nemala*, in Greek *Myrmex*, in Latin *Formica*, and in the Turkish and Arabic languages *Neml*. In the *Proverbs* (chap. vi. ver. 6, and chap. xxx. ver. 25) the sluggard is directed to go to the ant, "and consider her ways;" and in a second passage we are told that "they prepare their meat in the summer." Now that the ancients believed that ants hoarded up grains of corn will, I think, be generally admitted; that they hoarded them up against the winter, or that they hoard at all, is denied by some modern Entomologists. That ants hoarded up grains as winter store, there is not the slightest intimation that I can find in any part of the Bible; and we may ask, Whence then has the opinion originated? Probably with other writers. Let us for a moment refer to the poets of antiquity; they will assist us to solve the question. In Virgil we find that his opinion of their instinct amounted nearly to reason, where he states (*vide Geor.* I. v. 184) in the *Georgics*—"inopi metuens formica senectæ." In the fourth *Æneid*, line 402, he mentions that the grain was hoarded up against the winter.

> "veluti ingentem formicæ farris acervum
> Quum populant, hiemis memores tectisque reponunt."

The well-known passage in the Satires of Horace is somewhat in accordance with the above.*

If, in addition to the above quotations, any individual doubts that the ant is provident, let him consult the third volume of the *Hierozoicon*, where the learned and indefatigable Bochart cites a host of authors, all concurring in the same opinion. Indeed, so

* "sicut
> Parvula (nam exemplo est) magni formica laboris
> Ore trahit, quodcunque potest, atque addit acervo
> Quem struit, haud ignara ac non incauta futuri.
> Quæ, simul inversum contristat Aquarius annum,
> Non usquam prorepit, et illis utitur antè
> Quæsitis sapiens."—*Vide Sat. I.* lib. i. ver. 33.

Hesiod, among the early Greek writers, called the ant *Idris;* that is, *wise*. Sopheanus, an Arabian author, gives us also the following passage: "Nullum animal cibum recondit præter hominem, *formicam*, et murem;" and Poli, in his Synopsis, adds—"sed mus ad breve tempus recondit, sola *formica* in annum unum et plures."

numerous are the authors quoted, that it does appear to me somewhat remarkable, that the fact of ants hoarding up grain was ever a disputed point. I shall only allude at present to one passage, in the works of Sir William Jones, which agrees with those of the other authors already mentioned. He states, "Never shall I forget the couplet of Firdausi, for which Sadi, who cites it with applause, pours blessings on his departed spirit.

'Ah! spare yon *Emmet*, rich in *hoarded* grain,
He lives with pleasure, and he dies with pain.'"*

From the above writers it will appear then, that the notion of ants hoarding up grain was entertained in Asia and Europe; and if any person is still disposed to question this point, let him explain away, if possible, the statement of Colonel Sykes respecting *Atta providens*, which is published in an early number of our Entomological Transactions. As the first inquiry is then disposed of, viz. that the ant is a provident insect, let us next examine if Virgil's opinion is correct, "That ants hoard up grains against the winter." Now if Colonel Sykes is accurate in his statements, and he can scarcely be otherwise, for he has specimens of the seeds he saw the ants bringing up from below, to the heap on the surface of the earth, specimens of the grass producing the seed, and he wrote down in his diary the same day the facts as he had witnessed them, I think it will be seen at once that his facts tend to confirm the opinion of the ancients, that ants provide against a season of need, call it winter, or any other season. The statement from the Transactions is nearly as follows:—"The grass seeds were treasured up by the ants before the rains commenced; they were probably injured by the wet, and the ants were busily occupied in exposing them to the influence of the sun." It appears then that that *measure* which in one country was attributed to the ants as precautionary against cold, may, with equal justice, in another clime be applied to the influence of the rains during the monsoon. So little is known respecting the œconomy of our indigenous insects, and even less regarding exotic species, that it would be rash to hazard a decided opinion concerning them. And it will be borne in mind (as we find to be the case amongst some species of birds and mammalia) that a habit which characterizes a species in a particular climate, is no longer the characteristic of that species in a different climate. The same species of animal that hybernates in extra tropical climates no longer does so within the tropics. It will be borne in mind, also, that in the great family of the ants, the species of some genera may

* Vide Works of Sir William Jones, vol. i. p. 153.

have a provident instinct, and others be destitute of it. With a view of inviting inquiry and investigation on the statement before us, I have drawn up a few queries, which, if satisfactorily answered, may tend to remove all difficulties, and settle a long disputed point.

1st. What is the general food of our European ants?
2dly. What is the food of the *Atta providens* and other species of Asia?
3dly. Do exotic ants, particularly those of the genus *Atta*, derive any sustenance from *Aphides?* If not, the œconomy of the races are distinct, and it is probable that the hoarded grains are their usual food.
4thly. Do the ants of tropical countries become torpid during any part of the year? Probably not.

In concluding these observations, I have only to add, that I think it probable that the ant, of which Solomon has made mention, belongs to the genus *Atta;* and if at present or at any future time this point can be settled, the most appropriate name would be *Atta Solomonis.**

* Since the above remarks were written, I have met with a passage in Meer Hassan Ali's History of the Mussulmauns, giving an account of a species of red ant which stores up grain. It is as follows:—"More industrious little creatures cannot exist than the small red ants, which are so abundant in India; I have watched them at their labours for hours, without tiring; they are so small that from eight to twelve in number labour with great difficulty to convey a grain of *wheat* or *barley*, yet these are not more than half the size of a grain of English wheat. I have known them to carry one of these grains to their nest, at a distance from 600 to 1000 yards; they travel in two distinct lines over rough or smooth ground, as it may happen, even up and down steps, at one regular pace. The returning unladen ants invariably salute the burthened ones, who are making their way to the general storehouse, but it is done so promptly that the line is neither broken, nor their progress impeded by the salutation. The natives tell me these little pests will feed on the human body if they are not disturbed; when any one is sick there is always great anxiety to keep them away."—Vide vol. ii. p. 99. Wherever the red ants colonize, prosperity attends (as is the common opinion) the owners of that house. They destroy the white ants, though the difference in their size is as a grain of sand to a barley-corn, and on that account only may be viewed rather as friends than enemies to man, provided by the same divine Source from whence all other benefits proceed. Vide Meer Hassan Ali's History of the Mussulmauns, p. 102.

XLIV. *On Caprification as practised upon the Figs in the South of Europe and the Levant, with Descriptions of the Insects employed for that Purpose; and Observations upon the* Agaon paradoxum *of Dalman.* *By* J. O. Westwood, *F.L.S., &c.*

[Read 2d January, 1837.]

It is one of the most interesting portions of the study of natural history to trace those higher relations which exist amongst the great divisions of nature, and to endeavour to discover the effects of each upon each. The botanist, for instance, who looks beyond the technical details of his science, strives to ascertain the relations of particular tribes of plants with particular geographical and geological districts; and the ornithologist discovers in the prominent features of a landscape, whether of rock, vale or flood, the peculiar character of the feathered tribes inhabiting the spot.

In Entomology hitherto but very little has been done in this branch of the study of nature, and which has been almost entirely confined to the connexion existing between certain insects and plants, having for its object the impregnation of the latter, or the removal of the entire pollinific masses, whereby the plant is rendered abortive. The most interesting observations upon this subject hitherto published are those by Professor Willdenow, in the "*Grundriss der Kräuterkunde*," by whom *Aristolochia Clematitis* is described as possessing such a structure that the anthers cannot impregnate the stigma, which office is performed by a minute *Tipula* (probably a *Cecidomyia*), several of which enter the throat of the flower, and are unable to return, in consequence of a lining of dense hair, which is directed downwards, but which, as soon as the pollen has been deposited upon the inclosed stigma, shrinks so as to enable the enclosed insects to escape. In like manner, in those species of plants which have the male flowers on one plant and the female upon another, as well as in those which have the stamens in one flower and the pistil in another, the impregnation is also almost universally performed by insects; and Sprengel asserts, that, in order to prevent hybridism, insects which derive honey or pollen from different plants indiscriminately, will during a whole day confine their visits to that species on which they first fixed in the morning, provided there be a sufficient supply of it; and Kirby and Spence notice a passage by

Dobbs, in the forty-sixth volume of the Philosophical Transactions, to the same effect.

On the other hand, it may be remembered, that at a former meeting of this Society a memoir by M. Morren was read, in which the agency of insects in preventing the impregnation of the *Asclepiadeæ*, by the removal of the entire pollinific masses, was described. (See Transact. Ent. Soc. Vol. i. App. p. xliv.)

The process of caprification seems, however, to be the most important instance in which insects are employed in promoting the developement of vegetables. This process, as described by Theophrastus, Plutarch, Pliny, and other ancient writers, corresponds with what is practised at the present time in the Archipelago and in Italy. These authors all agree in declaring that the wild fig-tree, *Ficus caprificus*, never ripened its own fruit, but was absolutely necessary for ripening that of the garden or domestic fig. The reason of this success has been supposed to be, that by the punctures of certain insects the vessels of the latter fruit are wounded, and a consequently increased action in the nutritious juices is induced; whilst some authors have supposed, that the wound is accompanied by the emission of a fluid somewhat analogous to that supposed to be discharged by the common gall flies, and which, fermenting gently with the milk of the figs, makes the flesh of the fruit more tender. In confirmation of this view, it is stated that the figs in Provence, and even at Paris, ripen much sooner for having their buds pricked with a straw dipped in olive oil, considerable changes happening to the contexture of fruits so pricked, just as to parts of an animal pierced with any sharp instrument. Other authors again have maintained that by penetrating into the centre of the fruit, the insects form a passage for the free admission of the air and sun.

Linnæus, however, explained the process by supposing that the insects brought the farina from the wild fig, which contained only male flowers, to the domestic fig, which contained only female flowers. And I have the authority of Professor Don and Dr. Dickson, both eminent botanists, for adopting this view of the subject, the structure of the female flower being moreover of such a character as to require the interference of an insect for effecting its impregnation. Latreille also states that "les insectes qui en sortent (that is, from the wild figs) chargés de poussière fécondante s'introduisent par l'œil dans l'intérieur des secondes figues, fécondent par ce moyen toutes les graines, et provoquent la maturité du fruit."—*Hist. Nat.* tom. xiii. p. 204.

M. Bernard, however, opposes this explanation, stating, in the

Memoirs of the Society of Agriculture, that he could never find the insect in the cultivated fig, and that in reality it did not quit the wild fig until the stamina were mature, and their farina dissipated, adding that what they might have brought on their wings must be rubbed off in the little aperture which they form for themselves. At Malta, where there are seven or eight varieties of the domestic fig, this operation is only performed on those which ripen latest; the former are asserted to be of a proper size and full flavour without it; whence he adopts the opinion stated above, namely, that caprification only hastens the ripening. He examined the parts of fructification of the fig, and observes that if this examination be made previously to the ripening, there may be observed round the eye of the fig, and in the substance of its covering, small triangular dentated leaves pressed close one against another; and under these leaves are the stamens, whose pollen is destined for the impregnation of the grains, which fill the rest of the fruit. These male organs are much more numerous in the wild fig than in the domestic, and the stamens are found to contain a yellow dust, which may be collected when it is ripe. The wild figs when ripe are not succulent and have no taste, though the grains are disposed in the same way as in the other kind. The pith of the grain of the wild fruit serves as food to a small Hymenopterous insect, whose larva is white till the moment of its transformation, and it is by an opening in the direction of the pistil that the insect penetrates the grain. From these circumstances it is thought probable that the insect is only communicated by accident to the domestic fig, and that the flowers of this genus are sometimes hermaphrodites. But the number of hermaphrodite flowers being fewer on the cultivated than on the wild fig, the seeds are fecundated more certainly and quickly by the caprification; and every botanist knows that when impregnation is completed, the flower soon withers, while, if by any accident it is delayed, it continues to bloom much longer. This view of the subject therefore explains very completely the reason why, in Malta, the caprification is practised on the late kind of figs, because it hastens the formation and maturity of the fruit.

Dr. Lindley, in the Penny Cyclopædia (art. *Caprification*), adopts this view of the operation, observing that fruits *bitten* by insects ripen sooner than others, the wound appearing to act as a stimulant to the local action of the parenchyma; hence branches of the wild fig, infested with the *Cynips Pscnes*, are introduced into the fig orchards, when the cultivated figs are preparing to become ripe, when the insects attack the latter and pierce the fruit, which

thus ripens sooner, enabling the growers to obtain two crops in a year, although the process is said to deteriorate the fruit. In opposition to this statement, the celebrated entomologist Olivier, who was for a considerable time in the Archipelago, affirms that this practice of caprification " n'est autre chose qu'un tribut que l'homme paye à l'ignorance et aux préjugés ; parcequ'en France, en Italie, en Espagne, et dans plusieurs contrées du Levant, où la caprification n'est pas connue, on y obtient des figues bonnes à manger."—*Nouv. Dict. d'Hist. Nat.* art. *Caprification.* It is however affirmed by other authors that a skilful caprification rewards the dexterous husbandman with a much larger increase of fruit than could otherwise be produced, and that a tree of the same size, which in the south of France, where caprification is not practised, may produce about twenty-five pounds of fruit, will by that art, in the Grecian islands, bring ten times that quantity ; and it will be observed that Olivier does not attempt to show that the " figues bonnes à manger " had not been naturally instead of artificially visited by insects.

The accounts given by Pontedera and Tournefort of the manner in which this curious operation is performed, are very precise ; that of the former is contained in the *Anthologia,* and that of the latter in the Voyage to the Levant, and in a memoir delivered to the Academy of Sciences at Paris, in 1705. Tournefort's account is as follows :—" Of the thirty species or varieties of the domestic fig-tree which are cultivated in France, Spain, and Italy, there are but two cultivated in the Archipelago. The first species is called *Ornos,* from the old Greek *Erinos,* which answers to *Caprificus* in Latin, and signifies a wild fig-tree. The second is the domestic or garden fig-tree. The former bears successively in the same year three sorts of fruit, called *Fornites, Cratitires,* and *Orni ;* which, though not good to eat, are found absolutely necessary towards ripening those of the garden fig. These fruits have a sleek even skin, are of a deep green colour, and contain in their dry and mealy inside several male and female flowers, placed upon distinct foot-stalks, the former above the latter. The *Fornites* appear in August, and continue to November without ripening ; in these are bred small worms, which turn to a sort of gnats, no where to be seen but about these trees. In October and November these gnats of themselves make a puncture into the second fruit, which is called *Cratitires.* These do not show themselves till towards the end of September. The *Fornites* gradually fall away after the gnats are gone ; the *Cratitires,* on the contrary, remain on the tree till May, and inclose the eggs deposited by the

gnats when they pricked them. In May the third sort of fruit, called *Orni*, begins to be produced by the wild fig-trees. This is much bigger than the other two, and when it grows to a certain size, and its buds begin to open, it is pricked in that part by the gnats of the *Cratitires,* which are strong enough to go from one fruit to another to deposit their eggs. It sometimes happens that the gnats of the *Cratitires* are slow to come forth in certain parts, while the *Orni* in those very parts are disposed to receive them. In this case the husbandman is obliged to look for the *Cratitires* in another part, and fix them at the end of the branches of those fig-trees, whose *Orni* are in a fit disposition to be pricked by the gnats. If they miss the opportunity, the *Orni* fall, and the gnats of the *Cratitires* fly away ; none but those that are well acquainted with the culture know the critical moment of doing this, and in order to know it, their eggs are perpetually fixed on the bud of the fig, for that part not only indicates the time that the insects are to issue forth, but also when the fig is to be successfully pricked ; if the bud is too hard and compact the gnat cannot lay its eggs, and the fig drops when the bud is too open.

"The use of all these three sorts of fruit is to ripen the fruit of the garden fig in the following manner. During the months of June and July the peasants take the *Orni* at the time their gnats are ready to break out, and carry them to the garden fig-trees; if they do not nick the moment, the *Orni* fall, and the fruit of the domestic fig-tree not ripening, will in a very little time fall in like manner. The peasants are so well acquainted with these precious moments, that every morning in making their inspection they only transfer to their garden fig-trees such *Orni* as are well conditioned, otherwise they lose their crop. In this case however they have one remedy, though an indifferent one, which is to strew over the garden fig-trees another plant in whose fruit there is a species of gnat, which answers the purpose in some manner."

In this account the insects are termed gnats, but it is quite evident, from the observations of all subsequent authors, that the insect here alluded to is either the Hymenopterous insect called *Cynips Psenes* by Linnæus, or one very closely allied thereto. It also appears certain that the eggs of the insect are deposited in the immature fruit, since the latter at a more advanced period are described as containing the larvæ, which subsequently bring forth another brood of the insect. Nevertheless we are still in ignorance of many points in the natural history of the insect, a knowledge of which would alone enable us to form a precise idea as to its mode of operation.

Pontedera has indeed given us a more minute account of the insect, which appears from his figures (*Anthol.* Tab. xi), notwithstanding its rudeness, to be a minute Hymenopterous insect, and also a figure of the infested fruit, with numerous botanical details. He states that he had noticed both sexes of his insect, and that the females were furnished with an exserted ovipositor; his figures however do not represent this appendage, and are probably those of the males. He found "larvas horum cynipum singulas in singulis germinibus ficus caprificæ;" and adds, "se hæc insecta quidem in caprificæ grossis nunquam autem in pomis ficus satiræ, nec in erinosyces serotinis, in quibus stamina et apices non reperiuntur, invenisse."

Hasselquist, in his *Resa til heliga Landet* (Stockh. 1757, p. 424, *et seq.*), describes three Hymenopterous insects, under the names of *Cynips Ficus*, *C. Caricæ*, and *C. Cycomori*.

The habits of the first of these insects, *Cynips Ficus*, are described thus: "Ficus fæminas inhabitat, quorum germina excavata ab illo repiri et in quovis fere germine unum reconditum. An Cupido Ficus qui farinam genitalem ex caprifico in ficum transfert? Gallæ locum obtinet heic ficus; germina corrodit insectum quod plus damni quam utilitatis fructui adfert. An hæc progenita officio deinde fungitur mediatorio?"

The second is described thus: "In eadem cum altero (*C. Ficus*) Ficu habitat. An præcedens ex altero sexu? an diversa species?"

The third, *C. Cycomori*, is merely described as inhabiting the fruit of the *Ficus Cycomorus*.

Linnæus, who was the tutor of Hasselquist, in the subsequent edition of the *Systema Naturæ*, united the *C. Ficus* and *C. Caricæ* together, under the name of *Cynips Pscnes*, referring not only to Hasselquist's two species, but also to the figures of Pontedera. He also gave the *C. Cycomori* as distinct, with the observation, "Habitat in Ægypti ficus Sycomori grossis. Fuscus, aculeo *longitudine corporis* exserto, sed debili, laxo, ut vix videatur Cynips esse. Antennæ thorace breviores, subulatæ, *basi crasso, conicæ!*"

Dr. Gravenhorst has published a very interesting memoir, in the *Beitrage zur Entomologie*, of the Natural History of Silesia, Part I. having for its title "Disquisitio de Cynipe Psene auctorum, et descriptio Blastophagæ novi Hymenopterorum generis." The new genus *Blastophaga* described in this memoir is established upon a single species, *Bl. grossorum*, respecting whose habits the following observations are made: "Collega æstumatissimus Dr. L. C. Treviranus coloniam mecum communicavit Hymenoptero-

rum parvorum, circa ducentorum, e grossis Ficus Caricæ feræ natorum quos e comitatu Tyrolensi adportaverat. Grossi floribus masculis et femineis repleti erant, germina autem omnia, perpaucis exceptis incolumibus inania et foraminibus singulis parvis rotundis percussa conspiciebantur. E his foraminibus Hymenoptera ista provenerant postquam larvæ eorum interanea germinum comederant et intra putamen intactum mutationem subierant." He then gives a minute description of the individuals of this colony, all of which were described as females, and as having the ovipositor "longitudine dimidiæ aut tertiæ partis abdominis;" and observes, "E vitæ ratione horum animalculorum conjiciebam ea ad Cynipem Psenen Linnæi referenda esse." He then introduces a disquisition upon the insects described by Pontedera and Hasselquist: and points out the differences in structure and habits between his insect and the genus *Cynips* and the *Chalcididæ;* concluding thus, "Num Cynips Ficus et Cynips Caricæ Hasselquistii vitæ ratione omnino cum nostra Blastophaga congruentes, num forsan quoque Cynips Sycomori Hasselquistii ad unum idemque genus cum illa redigendi sint, haud dijudicare queo cum species istas nec ipsas viderim, nec satis accurate descriptas invenerim."

I am fortunately enabled to clear up some of the doubts entertained by the author last quoted relative to some of these insects, extraordinary not only in their economy, but also in the peculiarity of their structure. In the Linnæan cabinet are preserved a considerable number of specimens, ticketed by Linnæus himself *Cynips Sycomori*, and doubtless forming portions of those brought from Egypt by Hasselquist himself. A minute examination of these insects has enabled me not only to ascertain their generic identity with the *Blastophaga* of Gravenhorst, but also to discover the real affinity of the anomalous genus *Agaon* of Dalman.

Blastophaga Sycomori. (Plate XX. Fig. 4.)

Ex individuis Linnæanis descripta.

Caput magnum, ovatum, depressum, lateribus subrotundatis, fossulâ longitudinali dorsali; oculis mediocribus lateralibus, ocellis obsoletis? *Antennæ* capite paulo longiores, ad marginem anticum capitis insertæ, 12-articulatæ; articulo 1mo magno, ob-conico; 2do minori, ad apicem ejus lateraliter inserto; 3tio subgloboso; 4to tenuiori, apice in spinam acutam lateralem exeunte; 5to minimo, angulariter præcedenti affixo; reliquis septem subæqualibus, ultimo tamen parvo conico, (tribus ultimis clavam sublaxam formantibus). *Mandibulæ*

magnæ, subquadratæ, conicæ, ad apicem internè bidentatæ, extus ciliatæ, et versus basin alulâ corneâ tenui, haud articulatâ, obovali, reflexâ, fere mandibularum magnitudine, transversè 5-serratâ, instructæ. *Maxillæ* minutæ, membranaceæ, lobo apicali rotundato et externè ciliato, et setâ parvâ loco palporum instructæ. *Mentum* minutum, membranaceum, compressum. *Labrum* minutum, ciliatum, exsertum, palpis obsoletis.

Thorax depressus, collari semicirculari; mesothorace parvo, parapteris distinctis; scutello magno; metathorace transverso.

Alæ anticæ maximæ, nervo subcostali, ad apicem cum costâ coalito nervoque parvo deflexo curvato, ad apicem subclavato. *Alæ* posticæ angustæ, enerves.

Pedes antici breves; femoribus maximis, obovatis, compressis; tibiis brevissimis, subtriangularibus; tarsis 5-articulatis, articulis 4 basalibus minutis, æqualibus, ultimo elongato, unguibus duobus parvis pulvilloque intermedio. *Pedes* intermedii formæ ordinariæ, graciles; tarsis 5-articulatis. *Pedes* postici incrassati; femoribus ovatis, compressis, basi parum constrictis; tibiis brevissimis, subtriangularibus, tarsis elongatis, 5-articulatis.

Abdomen depressum, sessile, breve, obovatum, oviductu abdominis dimidii fere longitudine; oviductu ipso gracillimo, vaginis longiori, his crassioribus, pilosis.

Color piceus, capitis parte anticâ antennarumque basi rufescentibus, harum apicibus fuscis; pedibus luteis; alis limpidis, punctato-pilosis, ciliatis; nervis fuscescentibus.

Long. corp. lin. $\frac{7}{8}$. Expans. alar. lin. $1\frac{3}{4}$.

Fig. 4 *a*, underside of the head; 4 *a**, head seen laterally; *, the basal joint of the antenna; †, the mandibular appendage; o, the eye; 4 *b*, one of the mandibles, with its appendage; 4 *c*, ditto, seen laterally; 4 *d*, the mandible detached from 4 *e*, the appendage; 4 *f*, the latter seen laterally; 4 *g*, the maxillæ and labium in situ; 4 *h*, the two maxillæ; 4 *i*, the mentum seen laterally; 4 *k*, the terminal joints of the antennæ; 4 *l*, fore-leg; 4 *m*, middle leg; 4 *n*, hind-leg; 4 *o*, abdomen seen laterally.

The extraordinary appendage to the base of the mandibles is totally unlike any thing which I have ever observed before. Gravenhorst describes the trophi in his *Blastophaga* thus: "Oris partes haud distinctè visui patent, utrinque tamen palpus crassiusculus reflexus ovate orbiculatus, petiolatus clavatus subquadriannulatus (quadriarticulatus) conspicitur." The part here described as the palpus is certainly identical with the appendage above de-

scribed in *Blastophaga Sycomori*, and is in no manner connected with the maxillæ or labium, which parts are destitute of appendages, except a minute spur in the place of the maxillary palpi.

The singular form of the antennæ, and of the anterior and posterior legs, is also quite unlike that of any other insects with which I am acquainted.

I am indebted to Dr. Klug for specimens of another curious insect, "*ex ficubus Ægypti*," which in several respects agrees with *Blastophaga Sycomori*, although in several of its more particular characters it cannot be associated therewith. I have therefore formed a new genus for its reception. The specimens are all females.

Sycophaga. Genus novum.

(Σῦκον, *ficus*, et φαγω, *edo.*)

Caput thoracis latitudine, posticè latius, anticè subattenuatum, fossulâ longitudinali dorsali. *Antennæ* versus partem anteriorem fossulæ insertæ, capite paulo longiores, 14-articulatæ; articulo 1mo elongato maximo, subcylindrico; 2do minori, duobus proximis minimis, annuliformibus; articulis 6 proximis longitudine fere æqualibus, at gradatim crassioribus, ultimis 4 clavam ovalem formantibus. *Mandibulæ* magnæ, acutæ, ad apicem subfalcatæ, subtriangulares, in medio externè emarginatæ et ciliatæ, intus edentatæ. *Maxillæ* minutæ, membranaceæ, lobo apicali angustiori, internè ciliato, spinâ minutâ loco palporum. *Mentum* elongatum, basi attenuatum; *labium* setis elongatis rigidis instructum, palpis biarticulatis. *Oculi* mediocres, laterales; *ocelli* haud distincti.

Thorax elongato-quadratus, collari magno anticè attenuato. *Alæ* magnitudine mediocres, nervis ut in *Blastophagâ*, at nervo deflexo ferè recto.

Pedes ut in *Blastophagâ*.

Abdomen depressum, obovatum, versus basin angustius; *oviductus* trisetosus, setis æqualibus, abdomine duplo longioribus et valdè incurvatis.

Sycophaga crassipes. (Plate XX. Fig. 5.)

Piceo-nigra, thorace depresso, æneo submicanti; pedibus magis subrufescentibus, femoribus supra obscurioribus, tarsis pallidioribus; oviductu rufo, vaginis pallidè luteis, apice nigris, pilosis; antennis nigro-piceis.

Long. corp. lin. $1\frac{1}{6}$. Expans. alar. lin. $1\frac{1}{2}$.

Fig. 5 *a*, underside of the head; 5 *b*, mandible; 5 *c*, maxillæ and labium in situ; 5 *d*, maxilla; 5 *e*, labium; 5 *f*, antenna; 5 *g*, fore-leg; 5 *h*, middle leg; 5 *i*, hind-leg; 5 *k*, abdomen seen sideways.

On reviewing the characters of the two insects above described with those of *Agaon paradoxum* of Dalman, an insect which has greatly perplexed Entomologists, it immediately occurred to me that I here possessed the true affinities of that extraordinary insect (of which a specimen has lately been presented to the British Museum by the Rev. Mr. Morgan), which also possesses a deep occipital fossula, in the front part of which the antennæ are inserted. The wings are furnished with the same single deflexed nerve, and the description given by Dalman of the appendages of the mouth corresponds with that of *Blastophaga*. "Palpos detegere non valui, sed media pars capitis subtus tegitur lamellis duobus recumbentibus parallelis relicta rimâ angustâ inter se, quæ ad mandibularum basin insertæ sunt, elongatæ cultriformes, capite arcte applicatæ et basin ejus attingentes." The ovipositor of this insect is very similar to that of *Sycophaga*, but the antennæ are terminated by three very large and distinct joints, and the legs are simple.

I regret that I cannot speak with precision as to the precise affinities of these insects. Dalman observes of the *Agaon*, "Ex allatis satis liquet insectum hocce ad ordinem Hymenopterorum pertinere, quorum ad familias et Pteromalinorum et Codrinorum accedere videtur, ob ani structuram priori forte potius associandum." He however describes the wings as being "forma et facie fere ut in Diapriâ."

Latrielle placed *Agaon* next to *Eurytoma* amongst the *Chalcididæ*, and it seems to me unquestionable that the curious little groups above described are certainly referable to that family rather than to the *Proctotrupidæ*. From all these insects however they are at once removed by their fruit-feeding habits, as well as by various anomalous portions of their structure, so that I hesitate to name any particular group in that family to which they ought to be considered as most nearly allied.

It is to be hoped that some future traveller in the East will enable us therefore to solve the difficulties which still exist respecting these curious insects, by the discovery of the sexes, and a more precise account of their habits.

I take this opportunity of introducing the following notes relative to the *Chalcis pyramidea*, Fabr., referred to in the Journal of Proceedings, Vol. ii. p. xxx. (5th December, 1836.)

From a sketch made of the specimen of this insect contained in the Fabrician Collection at Kiel, in 1835, as well as from the identity of its habits with that figured in pl. 20, fig. 6, which was procured by Mr. Sells from the nest of *Chartergus nidulans* (of which it was regarded by Réaumur as the female), I have not the least doubt that the two are specifically identical, although upon a minute comparison of Mr. Sells's specimens with the Fabrician description, several minute discrepancies are discoverable, as may be observed from the following description of the former.

CHALCIS PYRAMIDEA. Fabr. Syst. Piez. p. 163, No. 15.

(*Chalcis conica.* Fabr. Ent. Syst. Suppl. p. 242.)

Var. ♀ : facie omnino nigra, tegulis albidis macula basali nigra; femoribus 4 anticis nigris, apice albidis; tibiis anticis albis, subtus linea nigra; tibiis intermediis fascia media nigra; femoribus posticis nigris, externe linea dorsali albida, denticulisque 12; tibiis posticis nigris, supra linea albida, tarsis omnibus albidis, unguibus pulvillisque nigris; capite thoraceque punctato, scutello areolato apice obtuse bispinoso; abdominis segmentis duobus apicalibus utrinque puncto spiraculiformi ut in generibus *Ibalia* et *Leucospide*.

Long. corp. lin. 5.

Obs.—Specimina quatuor e nido *Chartergi nidulantis* exclusa omnino conveniunt.

Ad subgenus nostrum *Brachymeriam* pertinet.

XLV. *Descriptions of two new Coleopterous Insects, from the Collection of Sir Patrick Walker. By* G. R. Waterhouse, *Esq., Curator to the Museum of the Zoological Society.*

[Read 7th August, 1837.]

The two insects I am about to describe, having been placed in my hands for that purpose by Sir Patrick Walker, belong to the section *Longicornes*. The first I shall notice is evidently closely allied to the genus *Dorysthenes*, founded by Mr. Vigors, in the Zoological Journal,* upon the *Prionus*† *rostratus* of Fabricius, but may at once be distinguished by the absence of the large spine on the prosternum, which constitutes so remarkable a character in that genus, and by the prothorax being produced at the sides, and forming, on either side, three large spines. These distinctions induce me to describe it under a new sectional name; it agrees however in so many respects with *Dorysthenes*, that I can but regard it as constituting a subdivision of that genus.

Family PRIONIDÆ.

Genus Dorysthenes.

Sub-genus Baladeva.‡

Antennæ 12-articulatæ; articulo primo elongato, subcylindrico, ad apicem crassiore, secundo brevi, subconico; tertio primo longiore compressiusculo; cæteris gradatim decrescentibus, penultimo et quatuor prioribus ad apicem cyathiformibus et in processus duos compressos productis, quarto et quinto in processum unicum internè productis, secundo, tertio et quarto subtùs spinis frequentibus minutis obsitis.

Mandibulæ elongatæ, subgraciles et parùm incurvatæ, dentibus internis nullis, at denticulo externo ad mediam partem armatæ.

* Vol. ii. p. 514. Pl. XIX. fig. 4.

† [It seems probable that *Dorysthenes* of Vigors, *Dissosternus* of Hope, and a new genus lately published by Guérin, together with *Baladeva* of Waterhouse, form a peculiar family in the *Prionidæ*.—F. W. H. To these must also be added *Cyrtognathus paradoxus*, Falderm, and *Prionus Indicus*, Hope's Col. of Nepaul.—J. O. W.]

‡ The name of Hercules in India. It is suggested by the great size and strength of the insect, combined with its habitat.

[Obs.—Mr. Hope suggests that the name should be *Baladevus*, to agree with *Prionus*; but *Baladeva* must be masculine, and therefore the character *niger* must also be masculine.]

Palpi maxillares compressi, 4-articulati, articulo primo brevi, secundo et quarto elongatis, et inter se ferè æqualibus, tertio mediocri, ultimo ad apicem paulò latiore et truncato.

Palpi labiales compressi, triarticulati, articulo primo brevi, secundo et tertio elongatis, hôc ad apicem latiore et truncato.

Labium minutum ad apicem bifidum.

Thorax ad latera dentibus magnis armatus.

Pedes mediocres, femoribus tibiisque compressis; tibiis, nec non femoribus subtùs, spinis minutis confertis armatis.

Corpus subelongatum. *Collum* productum.

Baladeva Walkeri. (Plate XXI. Fig. 1.)

B. niger; pedibus antennisque ad apicem piceis; capite brevi; thorace glabro, dentibus duobus magnis ad latera, nec non angulis posticis acutè productis; elytris irregularitèr et crebrè rugosis, lateribus lævioribus lineisque duabus elevatis longitudinalitèr excurrentibus.

Long. corp. 2′ 10″.; lat. 1′ $0\frac{1}{2}$″.

Habitat in Indiâ Orientali.

I have named this magnificent insect after the most amiable and zealous Entomologist to whom it belongs. In size it greatly exceeds the *Prionus rostratus* of Fabricius, and is proportionately broader, but agrees with that species in the structure of the antennæ, palpi, and legs; the tarsi however are broader; it moreover has the hinder portion of the head greatly elongated, the large transverse eyes separated above by a narrow space, and the large mandibles which we observe in the insect just mentioned.

The mandibles, which measure eleven lines in length, are rather slender, slightly curved inwards, and pointed; they present a tolerably sharp inner edge, and on the outer side is a small tooth situated about halfway between the base and apex of the mandible; again, between this tooth and the base, numerous very minute denticulations are observable. The length of the head (measuring from the labrum to the thorax) is 9 lines, and its greatest width, which is towards the base, is $6\frac{2}{3}$ lines; between the eyes is a central longitudinal groove, and a longitudinal ridge on either side forms the inner margin of the eye; the eyes are large, transverse, and slightly emarginated in front: behind the eyes, the upper surface of the head is smooth, or very nearly so; on the under surface are numerous small, irregular transverse rugæ, the fore part is dilated, and produced on either side into an angle. The prothorax is broader than long, its length being $5\frac{3}{4}$ lines, and width

(without including the large spines) $9\frac{2}{3}$ lines; the anterior and posterior margins are slightly waved, and the fore part is rather broader than the hinder; the lateral margins are each armed with three acutely angular projections, the points of these processes being directed outwards; one is situated in front, one behind, and the third in the middle of the lateral margin; of these the last-mentioned is the largest, and the posterior spine (which may be regarded as a produced hinder angle of the thorax) is the smallest; the upper surface of the thorax is very delicately punctured, but to the naked eye appears smooth. The prosternum is greatly produced downwards on the hinder part, and the fore-legs are joined to this produced portion; between the bases of these legs is a narrow process of the prosternum, which, as it were, folds over the coxæ, its apex (which is obtuse) being directed backwards and upwards. The mesosternum has an obtuse process in front, the point of which is inserted under the process of the prosternum just described. The elytra are broadest at the base, attenuated behind, and very slightly dilated in the middle; the shoulders, or outer anterior angle, is slightly produced, they are covered with numerous minute, irregular rugæ, and these for the most part have a longitudinal direction; on each elytron are two, somewhat indistinct, elevated longitudinal striæ. The antennæ, if extended backwards, would reach rather beyond the middle of the elytra. The legs are moderately long and compressed; and on the underside of each of the femora are two longitudinal rows of minute pointed tubercles; on the four posterior femora, the space between these tubercles is concave, on the anterior femora it is flat. The tibiæ are furnished both on the upper and under sides with thickly-set minute tubercles. The tarsi are rather broad, especially those of the anterior pair of legs. The scutellum is of moderate size, rounded behind, and pointed in front.

EXPLANATION OF THE PLATE XX.

Fig. 1. *Baladeva Walkeri*, natural size.
1 *a*. Side view of the head and prothorax.
1 *b*. The labrum.
1 *c*. The labium, and portions of the maxillæ, with their palpi.

I now proceed to the second insect,—one whose place in the system I find it difficult to determine. Its somewhat broad form and short antennæ led me at first to suppose it might be allied to some of those genera which in most classifications follow the *Prionidæ*—*Pœcilosoma*, *Megaderus*, &c.—in the structure of its

thorax, mesosternum, legs, and antennæ, (if we except the length); and in the form of the head it however agrees most nearly with that group of which *Cerambyx moschatus* may be regarded as the type,—the genus *Callichroma* of Latreille.*

The general form of the head is that of *Callichroma;* the basal joint of the antenna is stout, as in that genus, and the remaining joints differ only in being a trifle shorter; they bear the same relative proportions one to another; the two terminal joints unfortunately are lost, but if present, the antennæ would no doubt, when bent backwards, extend nearly to the apex of the elytra; the thorax is broader than long, and nearly equal in width to the elytra; the upper surface is slightly uneven, and has scattered punctures, but no distinct tubercles. In the prothorax there is a great resemblance between this insect and the species of *Callichroma*, excepting that it is proportionately broader and shorter, and has the lateral projecting tubercle somewhat obtuse, instead of acute, as in that genus; the prosternum is also of the same structure. The mesosternum differs in having an obtusely pointed tubercle situated between the middle pair of legs. The elytra are broader than in *Callichroma*, more obtusely terminated, and also differ in having a glossy brilliant surface, instead of the somewhat dull and silk-like texture, so general in that group. The legs are less compressed, and rather shorter, and the hinder tibiæ are not curved. The tarsi resemble those of the genus with which I am comparing it.

The presence of a tubercle on the mesosternum, the shortness of the antennæ, greater width of the body, and straight hinder tibiæ, combined with other distinctive characters pointed out, renders it necessary to separate this insect from *Callichroma*. I propose therefore to characterize it under the name *Callona*† *tricolor*.

Callona tricolor.

C. splendidè viridis; capite, thorace, antennis, tibiis tarsisque nigris; thorace maculis duabus lunulatis ad latera insignito, his, nec non femoribus, corporeque subtùs sanguineis; segmentis abdominis posticè nigris.

Long. corp. $13\frac{1}{2}$ lin.; lat. $4\frac{1}{2}$ lin.

Hab. Caraccas?

* The palpi, which would furnish some guide in determining the affinities of this insect, are unfortunately broken off.

† From καλλόνη, *beauty*.

This beautiful insect Sir P. Walker has some reasons for believing is from Caraccas; he is however not sure of this being the true habitat.

The head and antennæ are black; the former is punctured, and has a longitudinal groove between the eyes; the thorax is also black; but on either side is a large somewhat irregular red patch, and in front of this is a small spot of the same colour; a small red spot is also observable on either side of the prosternum, near the base of the legs; the sides of the thorax are produced in the middle into an obtuse angle, and it has a transverse indentation behind. The scutellum is of moderate size, of an elongate triangular form, black, obscurely tinted with green, and slightly concave. The elytra are of a most brilliant glossy green colour, and very finely punctured; on the anterior half are some delicate rugæ. The mesosternum is black; the metasternum red, and darkly tinted on the fore part and sides; the segments of the abdomen are also reddish, but are edged with blackish; the tibiæ, tarsi, coxæ, and basal and apical portions of the femora, are black; the remaining portion of each femur is red.

XLVI. *On the Use of the Antennæ of Insects.* *By* George Newport, *Member of the Royal College of Surgeons, and V. P. of the Entomological Society of London.*

[Read 1st January, 1838.]

Most of the following remarks on the use of the Antennæ were prepared for publication in the summer of 1831, and transmitted at that time to the editor of one of the monthly journals,—the Magazine of Natural History,—but from an accidental circumstance were not published. Since that period some of the views here adduced have been advocated by other naturalists. The author, therefore, does not now present them to the Society as entirely novel, but only as being a summary of facts (many of which fell under his own observation) that tend to indicate the true use of these organs.

There are no parts in an insect which are perhaps less understood, or have given rise to more controversy, than the Antennæ. From their being immediately connected with the head, and largely

supplied with medullary matter from the very brain itself, we should naturally conclude that they must be of almost vital importance to the insect, or that the excision of even a portion would at least deprive the insect of its usual faculties. But this, experiments have amply proved is not the case. Every one who has been in the habit of collecting specimens for his cabinet must have remarked how frequently he has met with such as have had one of the antennæ mutilated, or perhaps have been wholly deprived of it, yet the instincts of the little creatures have not appeared to suffer, nor would their existence, probably, have been shortened in the slightest degree by the loss. Yet are these organs regarded with the utmost solicitude by their possessors, and are immediately withdrawn when they happen accidentally to have come in contact with any substance, which at once proves their great susceptibility of feeling as well as the solicitude of the insect for their preservation. Of what utility then are they to the insect? Are they for the purpose of smelling, touching, or hearing? Upon this question the greatest naturalists are undecided, some contending for one sense, some for another, and all supporting their opinions by experiments and plausible reasoning; nor is this diversity of opinion to be wondered at, when the various structures of the organs themselves and the modes in which they are used by different insects are considered. The only method by which we can arrive at a certain conclusion is by connecting experimental observations on the manner in which the antennæ are used by different insects, with remarks on their anatomical structure, and, comparing these, to observe how far they coincide so as to be universally applicable to the whole class, and to indicate the possession of the sense of smelling, touching, or hearing.

First, in our inquiry as to the probability of their use as organs of smell, we may premise, that in vertebrated animals, from man to the reptile, the organ of this sense is situated in the face or anterior part of the head; it consists of two or more apertures, the interior of which is of the most delicate structure, being furnished with small blood-vessels distributed over the whole surface, and anastomosing in minute glands, which secrete a thick mucus. This mucus is diffused all over the membrane, and the olfactory nerves ramify beneath it. It seems to be that the perfection of the sense depends in a great measure on the magnitude of the organ and its nerves, and the extent of surface acted on and properly supplied with mucus. Thus in the human species it has been often remarked by travellers that many of the savage tribes of Africa are distinguished for a very extraordinary acuteness of smell, and

it has been found by the venerable physiologist Blumenbach * that these are the tribes which have the greatest developement of the organ. It is the same with quadrupeds: the animals which subsist on fetid substances, or which trace their prey from the greatest distance, are those in which the mucous membrane has the greatest extent of surface; and Scarpa asserts that experiments on living birds have convinced him that the sense of smell is strongest in those which have the olfactory nerve the largest. The same is the case with fishes; the shark, which is noted for acuteness of smell, has a nervous trunk under the principal fold of the mucous membrane, and also branches in the lateral folds, from which proceed filaments that penetrate and are regularly distributed through the substance of the membrane. From all this it seems to be clearly inferred, that in articulated animals the organ of smell is to be sought for in the existence of a part analogous in structure to the mucous membrane of the nose in vertebrated.

Now to what extent does the general structure of the antennæ seem fitted to exercise the faculty of smelling? Since in no instance with which I am acquainted are the antennæ found to be lubricated with mucus exposed to the action of the atmosphere, and in only one or two cases are they perforated so as at all to resemble the olfactory organs of other animals, I am inclined to think that the more simple structures, the setaceous and filiform, would be best adapted for the olfactory sense, if indeed it resides in the antennæ.

Among those who believe that these are the olfactory organs is the celebrated Latreille.† He observes that the different species of beetles, *Dermestes*, *Sylphæ*, *Cleri*, and *Tenebriones*, perceive at a very considerable distance the smell of dead bodies and decaying substances, to which they resort to deposit their eggs; that such is the case with many species of *Diptera;* that the common blue flesh-fly, deceived by the odour of a species of *Arum* (the carrion-flower), alights on it, and deposits its eggs; and that all these species are distinguished by a greater developement of the antennæ than those of dissimilar habits. He observes also that many male insects have the antennæ much larger than their females, and this he thinks may be easily explained if we suppose these parts to be the seat of smell. Bonnet appears also to be of a similar opinion.

Huber, in his admirable work on Bees, conjectures that the antennæ are the organs either of touch or smell, but does not state

* Blumenbach's Physiology, by Elliotson. Second edition, 1817, p. 141.

† Samouelle's Entomologist's Compend. 1819, p. 26.

to which opinion he inclines; he suggests however that they may be organized so as to fulfil both functions at once. A late author, Mr. Samouelle (in the work just noticed, p. 26), also believes them to be the organs of smell, and founds his opinion chiefly on the observations of Mr. Marsham concerning the habits of the *Ichneumon manifestator*, and which, it must be acknowledged, seem at first to lead to the conclusion. The account given by Mr. Marsham is, that in June, 1787, he observed one of this species on the top of a post in Kensington Gardens. "It moved along," he says, "with great rapidity, with its antennæ bent in the form of an arch, and, with a strong vibratory motion in them, felt about until it came to a hole made by some insect, into which it thrust them quite up to the head. It remained about a minute in this situation, apparently very busy, and then, drawing its antennæ out, came round to the opposite side of the hole, and then thrust them in again and remained nearly the same time. It next proceeded to one side of the hole, and repeated the same operation there. Having now again withdrawn its antennæ, it turned back, and, dexterously measuring a proper distance, threw back its abdomen over its head and thorax, and projected its long and delicate tube at its tail into the hole. After remaining nearly two minutes in this position, it drew out the tube, turned round, and again applied its antennæ to the hole for nearly the same time as before, and then again inserted its tube. This operation was repeated three times; but Mr. Marsham approaching too near, in order if possible to observe with a glass what was passing in the tube, he frightened the insect entirely away."

"About a week afterwards Mr. Marsham was in Kensington Gardens, and saw several of these ichneumons at work. They appeared to pierce the solid wood with their tubes, which they forced in even to half their length, constantly passing them between the hinder thighs, which they closed in order to keep the tube straight when over-resistance would otherwise have forced them to bend. It appeared truly surprising to see an instrument, apparently weak and slender, able, with the strength of so small an animal, to pierce solid wood, half or three-quarters of an inch deep; but on particular attention it was discovered that all those that appeared to pierce the solid wood, did it through the centre of a small white spot resembling mold or mildew, which, on minute examination, was found to be fine white sand, delicately closing up a hole made by the *Apis maxillosa*, and where no doubt there were young bees deposited."

The insects, it appears, often "thrust their antennæ into holes

and crevices, from which they almost immediately withdrew them, and proceeded in search of others." As the ichneumons deposit their eggs in the larvæ of other insects, Mr. Samouelle suggests it as probable that in some instances they found the holes empty, and proceeded in search of those in which the object was concealed; and at the same time he inquires—since the antennæ of the ichneumon are not near so long as the ovipositor or tube, and consequently could not always have touched the larva in which that instrument afterwards deposited the eggs—whether from the above facts we may not conclude them to be organs of smelling?

It must be acknowledged that these facts go farther in support of the opinion than any previously adduced; but I would inquire whether the same facts would not go equally far in proof that the antennæ are organs of hearing? To this however we shall return hereafter.

In July, 1829, I examined the anatomy of the antenna of a male of one of the larger ichneumons, *I. Atropos*, Step., the species that infests the larva of the privet moth *Sphinx Ligustri*, L. It consists of about fifty-six articulations, all of which, excepting only the second, from the base to the tip, are gradually diminished in size, and perforated all round by very minute holes, those nearest the tip having also a few scattered and very delicate hairs. This is the general structure of the setaceous antennæ of most insects. Upon making a section of the antenna, I observed its interior to be very copiously supplied with a limpid fluid, and that in addition to a delicate nerve in the centre which extended throughout the whole length of the organ, were, one on each side, two silver-coloured tubes, from which a number of other minute tubes were produced at every joint. That these were hollow tracheæ I am certain, having divided them longitudinally, and observed their beautiful silvery appearance within. Their structure in every respect resembled that of other tracheæ.* The exterior or bony part of the antennæ was perforated, as above noticed, by very minute holes, and these seemed to me to communicate with the minute tubes proceeding from the larger vessels, but of this I am not quite certain. There were so many of these that I counted eleven on each side of several of the joints through which the section was made.

* I have since found that these tracheæ are derived from some cruciform branches which originate in the head immediately behind the brain, from the superior transverse tracheæ which arise, one on each side, from the first pair of spiracles, and anastomose in the upper part of the head above the cranial portion of the dorsal vessel. See Phil. Trans. 1836, Par. II., p. 534.

Hence it seems probable that, judging from analogy with other animals, and also from the anatomy of the antennæ, that these are not the organs of smell. But let us now proceed to experiments and further observations.

The carrion beetles, *Sylphæ*, L., and other insects that subsist upon fetid substances, appear to be the kinds most fitted for our purpose, as being those in which a strong sense of smell is clearly evinced, and which at the same time have the antennæ considerably developed. Accordingly to these my attention on the subject has been chiefly directed.

During an entomological excursion I met with a female specimen of *Sylpha obscura*, L., that had by some chance been deprived of one of its antennæ. The insect was on a foot-path by the road side, near some decaying animal substance on which it had just fed, and was moving about apparently with some uncertainty, as, instead of running off as is usual with its congeners after being satisfied with food, it stopped, and moved its head and remaining antenna in every direction, and did not seem to be so much affected by sounds as most of its family usually are. What the object of its motions was, is not apparent, but it is evident that, having just fed and being at the same time in the immediate vicinity of aliment, it could not be searching for that, and it is probable therefore its motions were not influenced by the sense of smell. I next endeavoured to ascertain whether the *Sylphæ* can discover the presence of aliment by means of the antennæ when placed very near to those organs. For this purpose I took a male specimen that had been confined for sixteen hours without food, and, placing it in a glass, attached a small piece of flesh within half an inch of it. The antennæ, as is usual with these insects, continued to be moved about on either side, but with nothing remarkable in their motions, while the head of the insect was a little elevated and carried forwards, as if it perceived the flesh, and the palpi were in rapid vibratory motion. It soon approached very near to the food, and at length touched it three or four times with the antennæ, but each time suddenly withdrew them as if they had fallen unexpectedly on something obnoxious, the palpi during the whole time continuing their motion. The insect at length reached the food, and after having touched it once or twice with the extremities of the palpi, their motion ceased, and it commenced feeding, while the antennæ were occasionally in motion as before. This experiment was repeated many times and with precisely the same result. During the experiment it was sufficiently proved to me that the creature discovered its food by the faculty of smell,

and its immediate contact by that of touching with the palpi and antennæ; but I remarked nothing that could in the least induce me to suppose that the olfactory sense resides in the antennæ, or even in the spiracles of the body, as some have supposed.* If this were the case we might reasonably have expected that the insect would soonest have discovered its food when it lay on one side of it in a line with the spiracles or with one of the antennæ, and not when directly in front. On the contrary, the insect frequently moved in an opposite direction, and seemed to find its food most readily when placed, although at a greater distance, directly in front of it. Hence a question naturally arises, if it be neither in the spiracles nor the antennæ, where does the sense of smelling reside? Analogy teaches us to search for it in the head, as suggested by that excellent and venerable naturalist the Rev. W. Kirby, the father of English entomologists, and where after all, perhaps, it may be found.

Animals inhabiting water have the faculty of smelling equally with those which inhabit the atmosphere. This is proved from the known fact that odoriferous substances, often used by poachers as bait, when thrown into ponds or rivers attract fishes from a great distance, in the same manner as they would attract birds or quadrupeds in the atmospheric air. And here I may notice a striking instance of the existence of this faculty in water-beetles, previously to detailing experiments on them with regard to the use of their antennæ.

Towards the latter part of the summer of 1830 I frequently observed many different species of water insects, particularly *Dytici*, *Notonectæ*, and water *Cimices*, sticking to the sides, and lying beneath the wall of an outhouse that had been recently covered with coal tar, and I was awhile in doubt to know what could have attracted so many of such different species to that particular spot, which was at a considerable distance from their natural haunts, there being neither dike nor pond within nearly a quarter of a mile. It at length occurred to me that they must certainly have been attracted thither by the tar, which, it is well known, emits an odour of carburetted hydrogen gas, and which gas is also abundantly formed in stagnant pools and dikes, the usual habitations of those insects. What tends in a measure to confirm my opinion is, that although at the present time (April, 1831), after an interval of nine months from the date alluded to, the odour of the tar is considerably diminished, the same species are still attracted to the spot, and have not been observed on any

* Cuvier and Lehmann.

other part of the premises. It was one of the tribes of insects thus proved to possess the faculty of smelling to a considerable extent that was chosen as the subject for my experiments on the antennæ of the water-beetles. The individual was a female of *Hydaticus cinereus*. This appeared the more fitted for the purpose because the species has setaceous antennæ, and thus appears to offer a more fair comparison with that of the ichneumon above noticed. I had purposely confined the insect for three days without food in a cup about half filled with water, and, at the expiration of that time, attached a small piece of raw flesh to the end of a wire, and carried it several times along the sides of the insect, particularly near the spiracles, where it was suffered to remain for a short time; the insect however did not appear to perceive it, but during the whole time remained in the water perfectly undisturbed. The flesh was then carried very near to one of the antennæ, but without exciting the slightest motion in that organ, while the insect began to move its palpi very briskly, as if it detected the presence of something, but continued in other respects motionless as before. The flesh was then brought in direct contact with the antennæ, and the insect immediately withdrew them as if annoyed, as in the experiment with the *Sylpha*. It was then carried exactly in front, and at about the distance of an inch; the palpi were instantly in rapid motion, and the creature, darting forward, seized the flesh, and began to devour it most voraciously. The following day the experiment was repeated several times, and with precisely the same result, but on this occasion the antennæ were so repeatedly touched with the flesh, that the annoyed insect kept them at last beneath the sides of the thorax.

Hence I think it must appear that, from there being no alteration in the motions of the insect when the food was held near the sides of its body, the sense of smelling does not reside in the spiracles, nor, for like reasons, in the antennæ; while, from the motion of the palpi and the avidity with which the insect darted upon the food when held in front of it, it seems but fair to conclude that the sense of smelling must certainly reside in the head, as above suggested.

The next experiments were on insects with pectinated antennæ, and these, it will be seen, discover their food by means of the olfactory sense. The specimen chosen for my purpose was a male stag-beetle, *Lucanus Cervus*. It had been confined in a wooden box about fourteen days, entirely without food. Feeling satisfied, from an examination of the parts of the mouth, that

vegetable aliment was its proper food, a piece of wheaten bread, well moistened with water, was placed at about one foot distant from it. The insect had previously to this been remaining at rest, but immediately after began to move its palpi, elevated its head, extended its antennæ, put itself in an attitude for motion, and protruded the delicate laciniæ from its mouth, as if in search of something. The antennæ were then alternately elevated and depressed, and used as if in the act of exploring, touching everything within reach of them, both backward and forward, while the palpi continued their motion, and the laciniæ were repeatedly protruded to their fullest extent. The insect then advanced a few paces, stopped, and continued its motions as before. Being on a table covered with a green woollen cloth, and nearer to the aliment, the object of its search, the insect seemed as if deceived with regard to the substance it was placed on, and after firmly attaching its claws, straightening its limbs, and setting them at angles with its body, which was elevated upon them, it began, with extended mandibles, to attempt tearing the cloth, by fixing their forked extremities into it, and with evident exertion elevated itself to the utmost, as if in the act of tearing or stripping off the bark from the root or branch of a tree, and then, depressing its body as closely to the table as possible, extended the laciniæ as if to sip the fluid it instinctively expected to flow from the supposed wound. Upon not finding this, the palpi were again in rapid motion, and the antennæ used for exploring as before. It then advanced a pace or two, and the nearer it approached the food seemed to repeat its motions with greater effort. In order to discover whether the antennæ were the olfactory organs or were merely used as tactors for exploring, the moistened bread was placed within three-fourths of an inch of the side of the head, and within reach of one of the antennæ, but the creature did not turn aside to obtain it. The bread was then placed at the side of the abdomen, near the spiracles, but no difference in the insect's movements was perceived. It was then placed in front, within reach of the mandibles, and the motions of the insect were then evidently greater than before. These experiments, like the former, were repeated several successive days, and always with the same result.

Hence it appears, in the first place, that the insect was rendered sensible of the presence of vegetable aliment, its proper food, by means of the olfactory sense; that this resides somewhere in the vicinity of the mouth, in the anterior part of the head, and that there are good reasons for believing it does no

reside in the antennæ, or in the spiracles of the body. It must also be remarked that the antennæ of this insect are often used for the purpose of touching or exploring, although previously to flight, upon the occurrence of a loud noise, or when alarmed, they are stretched out to their fullest extent, with their plates widely separated, as if to catch the vibrations of the atmosphere.

On a review of the preceding I think it must be admitted that the antennæ are clearly proved not to be the organs of smell, the only observations at all tending to support their claim to the possession of that sense being those on the ichneumon, to which I must advert hereafter.

It has been supposed by many naturalists that insects are not endowed with so acute a sense of feeling as other animals, though it is evident that the antennæ of at least some species possess very delicate perceptions, since if they be ever so slightly touched the insect withdraws them. This, however, is not the case until they are actually brought into contact, whether it be with the most inoffensive substance or the most noxious poison. The antennæ we find, accordingly, are used as organs of touch in many insects, though not in all.

The experiments of Huber on the queen-bee more directly prove the existence of the sense of touch in the antennæ than any others. These observations are known to every naturalist, but I may perhaps be allowed to notice them here in illustration of the use of these organs. He cut off one of the antennæ and found that very little injury was sustained, but on depriving the insect of both a decided effect was observable. From that moment she traversed the comb rapidly, laid her eggs very irregularly, depositing them indiscriminately in the cells, retired to the most solitary parts of the hive, and for a length of time remained motionless. When followed by some of the workers, and treated with their usual attention, she seemed to be totally unconscious of it, seldom requiring honey from them, and, when such was the case, directing her trunk for it with great uncertainty. Contrary to her natural habits, she seemed eager to escape from the hive by rushing towards the entrance, and desisted from the attempt only after several fruitless exertions.

The individual used on this occasion had been retarded in her fecundation, and in consequence laid only the eggs of males. Huber, afraid that her instinct might have suffered from this cause, deprived another female, whose fecundation had not been retarded, of the antennæ, and introduced her into the hive. Exactly the same symptoms were exhibited in this as in the other

case. And although it is usual for two queens, who are present in the same hive, to fight till one be destroyed, the mutilated queens exhibited no animosity towards each other, neither did the inhabitants of the hive appear to distinguish which was their original female. It would thus appear that, after excision of both antennæ, all marks of distinction were lost.

At another time, Huber divided a swarm into two portions, leaving the queen in one and separating these by a double grated partition, which allowed what was going on among the one to be seen by the other, but prevented the two parties from communicating by means of the antennæ or legs. This was for the purpose of seeing what was the mode of intercourse, and also, what effect was produced upon those who were deprived of their queen. They were soon in great agitation, running violently about, striking each other with the antennæ, and entirely neglecting the business of the hive, until at length they began to construct royal cells and became quiet. Those that had the queen with them remained undisturbed and pursued their usual avocations. One portion of the double grating was then removed, so as to prevent the two parties from mixing, but allowing them to communicate with each other by passing the antennæ through the wires. Immediately the bees were seen to collect upon the grating, pass through their antennæ, and touch with them those of the others. The queen herself came to it, and acted in the same manner. The clamour began to subside immediately, each bee touching with its antennæ those of its neighbour, and in a short time the business of the hive was restored. It was thus proved that bees communicate with each other by means of the sense of touch, and that this resides in the antennæ.

The case is the same with ants, as was abundantly proved by the same author. By means of touching with the antennæ, ants originally bred in the same nest are enabled to recognise each other, although they may have been entirely separated many weeks, or even for three or four months.* When about to form a new colony, they caress, and appear to communicate with each other by touching with the antennæ,† and it is by means of these organs they are enabled to induce the *Aphides* and *Cocci* to give out their sweet juice, or, as it is commonly called, honey-dew, which the ants are exceedingly fond of. Their mode of proceeding, which I have had the pleasure of witnessing, and which is well known to entomologists, is to pat the *Aphis* rather briskly on each side of

* Kirby and Spence, vol. ii. 1st Ed. p. 66. † Id. vol. ii. p. 92.

the body with the extremities of the antennæ until it gives forth its sweets, which the ant sucks up very eagerly, sometimes conveying it to the mouth on the tip of the antennæ. The same mode is pursued by the ants with the *Cocci*, excepting only that with these the strokes of the antennæ are so rapid as to be compared with the thrill of the fingers over the keys of a pianoforte.* Many of the ichneumons, and other tribes of Hymenopterous insects, use their antennæ as tactors. When searching for a hole or crevice in which to deposit its eggs, the insect will feel about on every side within reach with its antennæ, proceed for a short distance, suddenly stop and explore with them, and, having found a place fitted for its purpose, thrust them into it, and often remain for some time as if in the act of examining it. Another family of this order use the antennæ in a still more remarkable manner, as I once had an opportunity of observing. On the 25th of May, 1829, about 300 individuals of (I believe) *Eupelmus puparum*, Steph.,† or a species nearly related to it, were produced from two specimens of pupæ of a *Noctua*. They were confined in a breeding-cage, which was so well secured with gauze sides that no insect of their size could either enter or escape. A few of the insects had come forth the day before, when I remarked what appeared a very singular fact, and on this occasion I had abundant opportunity of confirming my previous observations. In the connexion of the sexes, the males were seen to fix themselves on the thorax of the females, and, before any attempt at union by means of the posterior extremity of the body, to bend their antennæ at right angles, and strike with them those of the female on the inner side, with very quick alternating strokes, which were returned by the antennæ of the females, but with much less rapidity. During the whole time the female continued perfectly quiet, with her wings folded, while those of the male were extended and agitated with the most rapid vibratory motion. This intercourse usually continued from five to ten minutes, and at its

* Kirby and Spence, vol. ii. p. 88.

† I am not quite certain that this was the species, but the following are the descriptions of both sexes of the insect. *Male.—Antennæ* brown, slightly clavate, shorter than body, eleven-jointed: first basal joint yellow, one-third of the length of the whole antennæ; third basal joint very short, joints at the apex scarcely distinguishable. *Body:* head and thorax green gold; eyes black; abdomen brown, with a pale band at the base; legs yellow; wings hyaline.

Female.—Antennæ fuscous at the base, shorter than those of the male; mandibles quadridentate; maxillary palpi long, yellow, four-jointed, labial two or three-jointed. Head, thorax and abdomen bronzed; eyes black, abdomen ovate, sting concealed, wings hyaline. Insect much larger than the male.

conclusion there was only a momentary contact of the anal extremity of the bodies of the individuals at the instant of the male leaving the female, after which the latter immediately took flight, while the male was always busily employed in cleaning his antennæ and limbs. At one time I counted seventeen pairs connected in the same manner. What was the object of this intercourse, if it were not copulation, is very difficult to determine. At all events, it seemed to be of the most reciprocal nature, and the antennæ, so far as I could perceive, were mutually employed.*

In the other orders of insects, as well as in many other Hymenoptera, most of the species with setaceous antennæ use them occasionally as tactors. Those which have them very long and delicate—the *Acridæ*, Kirby—often use them for exploring, in a manner similar to the ichneumons. The large green grass-hopper, *A. viridissima*, when searching for food, will frequently first touch it cautiously with its antennæ, and then examine with its palpi before it begins to eat. When passing from one object to another, it often uses them in the same manner as if exploring the way before it begins to move. That this really is the service the antennæ perform in directing its movements, which are not wholly guided by vision, will appear from its often tumbling from its hold when moving rapidly over bushes or rugged surfaces.

The antennæ are employed in exactly the same manner by another insect of the same genus, *A. grisea*. I once confined several of this species for three or four days without water, of which they require abundance, feeding them during the time upon leaves which were not very succulent. They became emaciated and feeble, and almost ceased chirping. Upon moistening the leaves with water, they immediately began to drink; but first, in order to assure themselves of the presence of the fluid, they touched it three or four times with the antennæ, and afterwards with the palpi. What more directly proved to me the discriminating faculty of the antennæ was, that when the fluid on the leaf was nearly exhausted, the insect felt about with them for the veined or channelled part of the leaf's surface, from which the water might be completely drawn off.

* Mr. Westwood has suggested that the antennæ of these males were probably used to excite the female preparatory to the connubial intercourse. I fully agree with him in this opinion. I have seen the antennæ used in a similar manner, but less actively, by the males of the *Melöe* during coition, and also by those of *Athalia centifoliæ*, in which the actual intercourse of the sexes is almost as momentary as it appears to be in the *Eupelmus* above noticed. The antennæ in these instances must, therefore, be endowed with an exquisite sense of touch.

The *Blattæ* employ their antennæ in a manner similar to the *Aeridæ*, moving them about in different directions, and exploring objects with them. The *Trichoptera*, Stephens, carry the antennæ directed forwards, like the *Ichneumons*, and sometimes use them as tactors. This also is the case with some of the *Coleoptera*. The *Telephoridæ*, when in motion, carry their antennæ directed forwards, vibrating them rapidly, and sometimes, but rarely, touching objects with them. The *Carabi* use theirs in a similar manner, but more frequently as tactors than the *Telephoridæ;* and it seems from our previous experiments* that at least one genus of insects with capitated antennæ (*Lucani*) employ them as tactors, but they cannot be so used excepting only by such as have the organs of considerable length. Whether those with moniliform antennæ, as the *Tenebriones*, *Staphylini*, &c., employ them as tactors, I have not had opportunity of observing; at least the *Staphylini* appear to use them in this way occasionally, but whether the *Tenebrio* does so is much to be questioned, since they appear to be almost always directed forwards and upwards.

It is thus evident that many insects use the antennæ as tactors; and these are mostly such as have them of the filiform or setaceous structure. Yet there are many that have them even of these forms that never use them as organs of touch, although they are of such a length as would enable the insect to do so with the greatest convenience. Among these are many of the *Sphinges* and *Phalænæ*, Lin., as well as some *Papiliones*. There are others that have the antennæ of these forms, but which, on account of their shortness, cannot be used as tactors, for which purpose indeed their diagonal direction, and apparent rigidity and want of muscles for motion, would alone disqualify them. Of this all the *Cicadæ*, *Notonectæ*, *Libellulæ*, *Ephemeræ*, some *Culices*, and many others, are instances. There are also a vast number of other insects in each of the orders, in which, from their very different structure, we cannot regard the antennæ as tactors. In some of these the organs are capitated, and the caput divided into plates. The whole of the Linnæan *Scarabæi* have this form. Now we could hardly suppose that an organ composed of a foot-stalk of joints, and surmounted by a plated knob, could be designed for the sense of *feeling*, and the manner in which these insects retract the antennæ when touched accidentally at once assures us they are not; besides which, in the generality of these insects, they would be too short. When they are so used by some *Coleoptera*, as by the *Lucani*, it appears to be but a secondary faculty, and in such instances the

* Page 237.

foot-stalk of the organ is considerably elongated. That the antennæ can hardly be said to be used as tactors when of the petiolated form, appears from the experiments on the *Sylpha* before noticed. Now nearly the whole of the *Diptera* have the antennæ either too short for the purpose, or of a form entirely unadapted to be used as tactors, while the greater number of a numerous class of animals nearly allied to, but now separated from, insects—although composing the *Aptera* of Linnæus—have no antennæ at all. If the sense of touch, therefore, were the primary use of the organs, one would have thought they would more have resembled each other in structure; at all events would never have been wanting, or so short as not to be applicable to the intended purpose, and it must hence appear that their use in every species that possesses them cannot be simply for the sense of touch.

Now by what means is it that animals are endowed with the faculty of hearing? This, as examination will prove, is purely mechanical. It consists in a means of *feeling the vibrations of the atmosphere*, for which I conceive the structure of the antennæ in every species might entirely adapt them. But it may be objected that we have not proved insects to possess the faculty of hearing, before attempting to point out the particular part in which the sense resides. One proof must suffice,—the sexual call of the *Ptinidæ*,—although many other instances might be adduced from almost every order and genus of insects. Entomologists are aware that a male of this family when in search of the female fixes his anterior legs firmly, and by striking with his head makes a noise like the tapping with one's finger against old partitions, pasteboard, or wainscoting. This call is perceived and returned by the female, often at several yards distance. The male advances and repeats the tapping, which is returned by the female, and this is alternately continued until the two have met. I do not allude to this in proof of the antennæ being the organs of hearing, but only to show that insects, and even those with the simple filiform antennæ, are susceptible of sound the same as the larger animals.

Grass-hoppers and butterflies are as sensible of sound as the *Ptinidæ;* on the occurrence of any loud and sudden noise they immediately erect the antennæ, and, when deprived of them, butterflies are evidently severely affected by the loss. I once plucked off the antennæ close to the head from two or three specimens of *Pontia Napi*, Steph., when they immediately rose in the air to a great height, apparently having no means of directing their flight, and were carried in a line before the wind. I tried some of the *Vanessa Urticæ;* and they, after rising a little, dropped down, as

if stupified and unable to keep on the wing. This was the case with several other species, but when deprived of only one antenna they seemed, like other insects, to experience but little inconvenience.

Now that hearing, as possessed by the larger animals, is purely mechanical, there can be little doubt, since the structure of the parts, exercised during the enjoyment of the faculty, fully demonstrates their mode of use. These consist in general of the ear or external portion, so constructed as to receive within its cavity the vibrations of the atmosphere, which, being collected within a passage, are considerably augmented, and thrown with greater force upon the tympanum, a tense and delicate membrane extended across the bottom of the passage, and from this, by means of other minute parts, the sensation is conveyed to the brain. The importance of this organ—the tympanum—for the perfection of the sense, is fully seen, since in no instance with which I am acquainted in vertebrated animals possessing the faculty is this part wanting, although differently situated in different species, and also from the loss of the faculty resulting from any injury by which the elasticity of the tympanum is destroyed. Upon the form of the external ear also the acuteness of the sense is considerably dependant. Thus in those vertebrated animals which are believed to possess the greatest acuteness of hearing, as the hare, rabbit, bat, &c., it is long and tubulated, affording a larger cavity for the reception of aërial vibrations, and a longer passage before arriving at the tympanum, by which the vibrations become very much increased. An approach to this form of organ is found in the antennæ of a genus of beetles, *Coprides*, Steph., to which, from their habits, we may suppose a greater acuteness of hearing to be necessary. These insects, particularly *Copris molossus*, in which I first remarked it, have the antennæ composed of ten joints, the last three of which form the knob or club with which it is surmounted. Each of these joints, which are long, in the form of leaves, when examined on the under side is found to be concave, and constructed like the ears of the hare or rabbit, and internally is supplied by the nerves which extend through the antennæ from the brain. When the insect is in motion, these plates or auditory organs, if we may be allowed so to call them, are extended as widely as possible, as if to direct the insect in its course; but upon the occurrence of any loud but sudden noise are instantly closed, and the antennæ retracted as if injured by the percussion, while the insect itself stops and assumes the appearance of death. A similar use of the antennæ is made by

another family, *Geotrupidæ*, Fab., which also act in the same manner under like circumstances. In one species of this family, *G. Hercules*, the structure of the caput antennæ is different, and more clearly indicates its real use. It consists of three joints, which, upon being closed together, form an oval-shaped knob. The two exterior of these joints are convex outwardly and concave within, the concavities covered by a tense membrane, so that they somewhat resemble a kettle-drum: the middle joint is flat, and has a membrane extended across both its surfaces. There is a space beneath all the membranes, which may fairly be supposed to be furnished with ramifications of nerves from the large one running through all the joints of the antennæ from the brain.

Here then we have a structure which almost positively indicates that the antennæ are for the function of hearing, since if the lamellæ are not for the perception of sound, they would answer no purpose at all, not being adapted for any other sense; and the antennæ of insects would form a singular exception to the economy and fitness of nature's works, since in no class of animals do we find so great a variety of structure in the same parts, and in none do we find a tense membrane designed for smelling, seeing, or touching, but in every one in which this particular structure is found it exists for the sense of hearing.

These facts, connected with the previous experiments, have convinced me that the antennæ in all insects are the auditory organs, whatever may be their particular structure; and that, however this is varied, it is appropriated to the perception and transmission of sound. We have now to show the means by which the different structures are adapted to this purpose. From the observations above stated I was once much inclined to believe that the seat of hearing, in the antennæ of butterflies and beetles, resides in the caput, but this cannot be the case with moths, ichneumons, &c. The experiments on the ichneumon by Mr. Marsham, as before remarked, are thought to go very far to prove that the antennæ are the olfactory organs, since they could not have touched the object they were examining, being shorter than the ovipositor. But surely they may be equally well suited to the sense of hearing as to that of smelling? Every one must have observed how rapid are the motions of the ichneumon, and how alarmed it is on the occurrence of the slightest noise. Hence, considering the anatomical structure of the antennæ as before described, might not the insect be rendered sensible of the presence of the object of its search—the larva of *Apis maxillosa*—by hearing it breathe, equally well as by smelling? That such was in-

deed the case appears the more probable from observations made both by Scarpa and Fabricius on the anatomy of the setaceous antennæ of the cray-fish, *Astacus fluviatilis*, Leach. Those naturalists found that the tympanum, or seat of hearing, was within the head, at the base of the antennæ, along the hollow cavities of which (and which appear to bear some analogy to the tracheal tubes in the antennæ of the ichneumon) they believed the sounds to be conveyed. Now this opinion is supported by the use which is made of the recently invented instrument, the stethoscope, which is simply a wooden tube, employed by the physician, by interposing it between his ear and the object to be examined, for the purpose of concentrating sounds and enabling him to judge of them with greater precision. Since then the seat of hearing in *Crustacea* is at the base of these organs, we may thence reasonably conclude that it is placed in a like situation in all insects with setaceous and filiform antennæ;* but it may still be objected that there are species with antennæ so formed as to make us doubt whether it be not by other than the means of a tympanum that they are rendered sensible of sound or atmospheric vibrations; and whether the true seat of hearing may not be differently placed in different forms of these organs? Since *elasticity* and *delicate* nervous organization are absolutely necessary qualities of the parts employed in hearing, may not the *elastic ciliæ*, with which many antennæ are covered, be so delicately constructed as to serve for this purpose? If this be not really the case, how are we to explain their use in many insects, particularly in the *Phalænæ*† and some *Muscæ;* and what reason shall we be able to assign for the antennæ differing so much in this respect in the male from the female? By admitting that the ciliæ in these insects perform an office analogous to that of the tympanum in others, the difficulty is overcome, and we see at once a reason why the antennæ of the males in all insects are more developed than in the female, and also why some species have them larger than others.

* The Rev. F. W. Hope has recently stated to me his belief that the organ of hearing is situated in some species at the base of the first or second joint, and this appears highly probable when the occasional large size of these parts is considered. Compare also the remarks of Burmeister, Manual of Entomology, translated, 1836, pp. 295, 296.

† According to Burmeister (Manual of Entomology, translated by W. E. Shuckard Esq., 1836, p. 295), G. R. Trevrianus has described the organ of hearing in *moths* as consisting of a thin drum situated in the forehead at the base of each antenna, but this structure is not found in all insects of other orders. Comparette also appears to have made similar observations in some species.

By means of these, it is probable, the males of many of the foreign *Bombyces*, which are known to fly a vast distance in quest of the females, discover the objects of their search; and our native species, *B. quercus*, *B. potatoria*, &c. find their partners even in the most secluded situations. That they do this by means of the antennæ is highly probable, and that these are employed as the auditory rather than as the olfactory organs is by far more probable. A few objections remain yet to be noticed. The roots of the nerves that go to the antennæ from the brain, being always on the front side of or immediately before those of the eyes, may at first seem to favour the idea of these being for the sense of smell, judging, as we do, from the origin of the olfactory nerves in other animals; but when it is known that in insects there are always other nerves originating from the lower part of the front side of the brain, and more analogous from their situation to the olfactories of the larger animals, this objection vanishes. Lehmann deprived the house-cricket, *Acheta domestica*, Steph., an insect noted for acuteness of hearing, of its antennæ, but the little creature was equally sensible of sounds as before. Now as this insect and its congeners have the antennæ formed almost precisely similar to the cray-fish, is it not probable that the seat of hearing, as in that animal, is placed within the head at the base of the antennæ, whence an excision of these organs would not destroy the faculty of hearing, although, doubtless, it would render it less perfect? Again, it has been remarked that spiders have much acuteness of hearing, yet have no antennæ. The general anatomy of these animals, it is well known, differs greatly from that of insects, and thence it cannot be wondered at that they are differently organized with regard to the auditory organs. May not these be constructed similarly to those of some reptiles that hear very acutely, but which have no external ears, the part answering to the tympanum being on a level, and connected with the common covering of the head, and thence in the spider remain at present undiscovered?

In conclusion, from all that has been observed of the antennæ it seems probable that in all insects these are the auditory organs, and that the means by which they are fitted for the function of hearing are varied in different insects, to adapt them to the perception of sounds according to the habits of the species; that in some species they are endowed also with the sense of touch; that they are of great, although not vital importance to the insect; and that the loss of both of them, more particularly when en-

dowed also with the sense of touch, will clearly explain in every instance the agitation, delirium or stupor of the insect, it being in fact tantamount to a total deprivation of the faculties of hearing, feeling, and, I might almost add, of speaking.

XLVII. *Memoir on the Genus* Holoptilus. *By* J. O. Westwood, *F.L.S. &c.*

[Read 2nd April, 1838.]

The genus *Holoptilus*, belonging to the terrestrial section of the Heteropterous *Hemiptera*, is one of those singular groups, of which examples are to be found in almost every tribe of creatures, which not only attract attention from their peculiar forms, but at the same time baffle the naturalist in his endeavours to arrange them with the existing well-determined families. This difficulty is of a twofold nature, resulting firstly from inaccurate observations on the structure of such groups, and, secondly, from their actual anomalous structure.

The body of these exotic insects is of small size and depressed, and thickly clothed with acute rigid setæ. The head is small, and narrowed behind into a short neck; the eyes are round and very prominent. The ocelli in *H. fuscus* and *Lemur* are very distinct, glittering, and placed on the hind part of the head, at an equal distance from each other and from the lateral margin of the head. They also, as it appears to me upon a careful examination, exist in *H. ursus*, although their existence in that species is denied by Messrs. Saint Fargeau and Serville, who were only acquainted with that species. The rostrum is short and thick, scarcely extending beyond the head, its tip being received in an impression in the front part of the prosternum. It consists of three joints, of which the basal one occupies more than two-thirds of the entire length of the organ, the two apical joints being very short. This is its structure, both in *H. ursus* and *Lemur*, although Saint Fargeau, Serville, and Burmeister, describe the second joint as by far the longest. I cannot discover any short transverse basal articulation, neither can I detect the labrum. The antennæ are long and densely clothed with long rigid setæ, varying in the proportion and apparently also in the number of their joints, as described more in detail below. The thorax is short, divided transversely into two portions, whereof the anterior is the shortest and nar-

rowed, and the posterior, thrice as broad as the head, with the sides rounded. The scutellum is small and triangular. The hemelytra are large, and extend beyond the abdomen, the corium being very small and basal, with two thick nerves united obliquely behind. The apical membrane is very large, and of a somewhat leathery consistence. In *H. Lemur* and *fuscus* the membrane is furnished with strong nerves, but in *H. ursus* they are almost obliterated. The wings, the existence of which is denied by Saint Fargeau, are of a very small size in *H. ursus* and destitute of nerves. They are of a larger size in *H. Lemur*, with three longitudinal nerves. The legs are slender and thickly setose, *the four anterior* being of a moderate size, but the posterior are longer, the tibia especially being elongated and curved, and very densely clothed with hairs, which in *H. Lemur* and *fuscus* are of a woolly appearance, but in *H. ursus* they are rigid setæ. At the tip of the anterior tibiæ are several rigid setæ on the inside, but these are not to be compared to the cushion at the tips of the anterior tibiæ of some of the *Reduviidæ*. The tarsi have been hitherto described as three-jointed, but after a very careful examination I can only detect two joints, the basal being very minute and obliquely truncate, and the terminal joint long and clavate in the four anterior legs, but broad in the posterior pair. This is the structure in *H. Lemur* and *ursus*. The abdomen is short, broad, and rounded; its ventral surface very convex, and consisting of five joints in the male and of six in the female.

The genus was established by Saint Fargeau and Serville, in the tenth volume of the *Encyclopédie Méthodique*, p. 280, for the reception of a small insect from the Cape of Good Hope, *H. ursus*. It was placed without hesitation in the family *Reduviidæ* or *Nudicolles*. The antennæ of the typical species were described as three-jointed only.

Subsequently Gray, in the Zoological Miscellany (1831, p. 34), proposed a new genus, under the name of *Ptiloccrus*,* for another insect, discovered in India by General Hardwicke, and of which a highly magnified drawing is preserved in his series of figures of Indian insects now in the British Museum. The genus was stated to be most allied to *Holoptilus*, but the antenna is four-jointed.

The not very appropriate specific name of *Ptilocerus fuscus* was given to the type. Laporte, Comte de Castelnau, in his Revision of the *Hemiptera* (p. 7), introduced the genus amongst the *Redu-*

* *Ptilocerus*, a genus of exotic *Diptera* described by Wiedemann.

viidæ, giving its characters from Saint Fargeau, with a figure of the typical species. In a subsequent page (47), however, he introduced it, under the name of *Lasiocera*, into his synoptical table of his *Tingidites;* and at page 50 he corrected the name to *Holoptilus*, and stated his conviction that it belonged to that group of *Hemiptera*. Lastly, Burmeister (*Handbuch der Entomol.*, vol. ii. p. 248) gave a new description of the genus, retaining *H. ursus* as its type, but stating that a second species from Java was contained in the Royal Collection of Berlin. He placed the genus at the end of his family *Ruduvini*, immediately preceding the *Membranacei* of Latreille (*Cimex*, *Tingis*, &c.).

Of the affinities of this genus, Messrs. St. Fargeau and Serville observe, that "Les *Holoptiles*, par la masse de leurs caractères, se rapprochent des *Réduves*, mais les antennes triarticulées, la nature homogène de leurs élytres, et l'absence des ailes, les en distinguent." There is indeed some resemblance in the nature of the hemelytra of these insects and some of the *Reduviidæ*, such as *Enicocephalus*, Westw., and *Opisthoplatys*, Westw.; but in all the insects of the last-mentioned family which I have examined the intermediate joint of the rostrum is by far the largest. The tarsi in *Reduvius* are distinctly three-jointed,* the terminal joint not occupying more than half the tarsus, and (except in such genera as *Ploiaria* and *Emesa*) the anterior tibiæ are terminated by a brush or cushion-like plate, more or less developed, and which is even to be found in the *Zeli*. The simple structure of the fore-legs, and the exposed rostrum, separate it from the *Phymatites* of Laporte, whilst the two-jointed tarsi and three-jointed rostrum separate it from *Tingis*, &c., in which the tarsi are three-jointed and the rostrum four-jointed. The three-jointed tarsi separate it from *Cimex*, which have three-jointed tarsi, but in which the rostrum is three-jointed. In *Aradus*, however, the rostrum is three-jointed and the tarsi four-jointed, as in *Holoptilus*. We should therefore be induced to regard it as most nearly allied to this group, but the rostrum is exposed, that is, not received when at rest in a canal formed by elevated margins on the underside of the head, and the general appearance of the insects is far removed from *Aradus*. It will perhaps be the most natural course to regard it as an osculant genus intermediate between *Reduvius* and some of the *Cimicidæ*.

As to the geographical range of this little group, it appears to be very widely distributed. The Cape of Good Hope is the

* This is the case with *Lophocephala* of Laporte. See Burmeister, vol. ii. p. 244.

locality of the typical species.* General Hardwicke's insect was from Nepaul, and Dr. Horsfield also found it in Java; and I have now to add another species from Van Diemen's Land. I am also able slightly to characterize a fourth species from Java in the Royal Collection of Berlin, hoping to receive a figure and more ample description of it from Dr. Burmeister in time for publication.

Notwithstanding the variations in structure which exist in the species, I am inclined to retain them in the same genus on account of their great general relation together, although I fear I shall be blamed for retaining such diversities of organization. It will be convenient, however, to establish a sub-genus for the reception of the *Indian* and *Australian* species, on account of the strong nervures of the hemelytra. I would for these species have retained Gray's name, *Philocerus*, but it had been long previously employed in Entomology.

Sub-genus 1. Holoptilus, strictè sic dictus.

Antennæ, ut videtur,† 3-articulatæ; articulo 2do longissimo curvato, setis in triplici serie dispositis; articulo 3tio minuto. *Caput* postice tuberculatum. Hemelytrorum *membrana* nervis obsoletis; *alæ* minutissimæ, aveniæ; *tibiæ* posticæ setis in triplici serie dispositis.

Species 1. *H. ursus.* (Plate XXII. Fig. 6.)

Fuscus, albo-sericeus; hemelytris albis, macula magna versus basin alterisque tribus minutis ad marginem externum fuscis, setis fuscis, serie intermediâ antennarum et tibiarum posticarum albâ.

Long. corp. (alis exp.) lin. $2\frac{1}{2}$. Expans. hemelytr. lin. 4.

Habitat apud Cap. Bon. Sp. Delalande.

In Mus. Reg. Paris., Berol. et nostr.

* In the Crochard edition of the *Règne Animal* an indifferent figure is published of *Holoptilus ursus* (*Insectes*, pl. 92, fig. 2), and in the text New Holland is given as its locality; but my specimen, which I obtained from the collection of the Jardin des Plantes is ticketed by M. Audouin himself "Cap. de b. esper. Delalande." The Cape is also given as its locality in the *Encyclopédie Méthod.*, and I am informed that Mr. Macleay obtained specimens from the Cape in a large collection which he purchased from M. Verreaux.

† Burmeister, who gives *H. ursus* as the type of the genus, describes the antennæ as four-jointed. Saint Fargeau, however, gave them in that species as three-jointed, and in my specimen they are also three-jointed and exhibit no appearance of mutilation.

H. ursus. Saint Fargeau and Serville, *Enc. Méth.* 10, 280; Burmeister, *Handb. der Ent. 2*, p. 248; Laporte, *Revis. Hemipt.* p. 7, g. 2, and p. 50; *Règne An.* Crochard Edit. Ins. pl. 92, fig. 2.

Sub-genus 2. Ptilocnemus.

Antennæ 4-articulatæ; articulo 2do longo curvato, duobus apicalibus parvis, setis irregularibus. Hemelytrorum *membrana* nervis crassis munita; *alæ* posticæ parvæ nervis tribus longitudinalibus; *tibiæ* posticæ valdè piloso-setosæ.

Species 2. *Holopt.* (*Pt.*) *Lemur.* (Plate XXII. Fig. 7.)

Luteo-fulvus, nigro-setosus, antennarum articulo 3tio fere dimidio longitudine 2di, 4to præcedenti minori; hemelytris ad basin pallidis, plagâ magnâ nigrâ ad medium membranæ extensâ, apice pallidè fusco, maculis nigris; nervis tribus longitudinalibus; femoribus posticis (apice excepto) tibiisque posticis (nisi ad basin) nigris; abdomine subtus nigro nitido, in medio fulvo.

Long. corp. lin. $3\frac{1}{2}$. Expans. hemelytr. lin. 7.

Habitat in Terrâ Van Diemenii.

In Mus. nostr. Communic. DD. Lewis et Ewing. Etiam in Mus. Reg. Paris. et Hope.

Obs.—The larva bears a close general resemblance to the imago, differing of course in the absence of hemelytra and wings, and also, which is remarkable, in having the posterior tibiæ and the coating of hairs of a dirty white colour, the thighs being annulated with black and dirty white.

Species 3. *Holopt.* (*Ptil.*) *fuscus.* (Plate XXII. Fig. 8.)

Pallidè fusco-rufescens; hemelytris ad basin pallidis, membranâ magis rufescenti, apice fuscescenti; antennis articulo 2ndo valdè elongato, 3tio minuto, 4to præcedenti duplo majori; hemelytris nervis 4 longitudinalibus nervisque nonnullis ad apicem adjectis, cellulas quadratas apicales formantibus, lineis maculisque ovalibus albidis inter nervos; tibiis posticis valdè et longè luteo-rufescenti setosis.

Long. alis clausis lin. $4\frac{1}{2}$.

Habitat in Nepaliâ—D. Hardwicke. In Javâ—D. Horsfield.

In Mus. Soc. Linn. Lond.; Soc. Merc. Ind. Orient. Londin. et Serville, Parisiis.

Syn.—*Ptilocerus fuscus.* Gray, *Zool. Misc.* p. 34.

Obs.—The accompanying figure was made from specimens

contained in the collection of the Linnæan Society. Gray's description appears to have been drawn up from General Hardwicke's drawings alone, the species not being in the collection at the British Museum.

Species 4. *Holopt.* (*Ptil.*) *affinis.*

Pallidè fuscus, fusco-setosus; antennis pedibusque luteo-fuscis; hemelytrorum basi pallido, membranâ apicali maximâ ferrugineâ lineis maculisque pallidioribus inter nervos dispositis, maculâ ad marginem externum membranæ apicalis versus basin alteraque versus apicem obscuris; tibiis posticis internè et externè densè pilosis.

Long. corp. (alis clausis) lin. $3\frac{2}{4}$.

Habitat in Insulâ Javâ.

In Mus. Regal. Berol.

DESCRIPTION OF THE FIGURES.

Plate XXII.

Fig. 6. *Holoptilus ursus.* 6 *a*, proboscis; 6 *b*, apex of antenna; 6 *c*, hind wing.
7. *Holoptilus* (*Ptilocnemus*) *Lemur.* 7 *a*, head sideways; 7 *b*, fore wing; 7 *c*, hind wing; 7 *d*, intermediate tarsus; 7 *e*, posterior tarsus; 7 *f*, male abdomen seen beneath; 7 *g*, female abdomen seen beneath.
8. *Holoptilus* (*Ptilocnemus*) *fuscus.*

XLVIII. *Notice of some Peculiarities observable in the Cornea of the Eyes of certain Insects.* *By* Robert J. Ashton, *Esq.*

[Read 1st May, 1837.]

The following two or three observations relating to some facts connected with the organ of vision in certain insects, which, as far as I am aware, have not heretofore been noticed by entomologists, I have thought it right to lay before the Society, in order to draw attention to the subject, and perhaps elicit something of interest from its consideration.

Burmeister, whose valuable "Manual" presents a compendious summary of all the observations previously made upon insects, in describing the structure of their compound eyes, says, "The horny integument consists of many small hexagonal surfaces, which *cor-*

respond exactly with each other, and cause the hemispherical, or at least convex, figure of the superior surface of the eye ;"* but this general description requires some qualification, as will presently be seen. On an examination of the cornea of the eye of certain insects, it will be found that it is divided into facets of *different sizes*, varying both in relative proportions and mode of arrangement in different species. Thus in some of the *Libellulæ*, as in *Libellula vulgata*, we find the whole of the upper part of the cornea, comprising nearly one-half of the eye, composed of large equal facets, and the remainder of the cornea divided into small equal facets, not above one-fifth of the size of the former in superficial measurement, the transition from the former into the latter being very abrupt, and the line of demarcation between them of a somewhat serpentine form (Pl. XXI. fig. 2), and in some other insects the appearance presented is even more remarkable. A peculiarity of this nature in the cornea, as far as my observation goes, only obtains in those insects which have large and prominent eyes, or such as are particularly exposed to the light ; in others the facets being perfectly uniform. Thus the only orders in which I have noticed it are the *Neuroptera* and *Diptera*, to which orders the insects most conspicuous for their highly developed eyes belong. It appears to me that the diversity of size and arrangement of the facets depends upon the *form* of the eye, and that the large facets are always placed where the light strikes most strongly upon the cornea. This in the before-mentioned insect, *Libellula vulgata*, is, I think, sufficiently apparent (see fig. 2, *a*, *b*). Thus also in the dipterous insect, *Scæva selenitica* (?), the large facets occupy the top of the cornea, and run down the centre of the eye in the form of a tongue ; the lower part of the eye, and a narrow slip on each side (especially posteriorly), to the top, being composed of uniform facets considerably smaller (fig. 3), presenting a very remarkable distribution ; but on examining the outlines of the cornea (fig. 3, *a*, *b*), it will appear that the part thus occupied by the large facets is precisely that most exposed to the light. Again, in *Asilus crabroniformis* there is only a narrow portion of the *anterior* part of the cornea consisting of large facets, the rest of the cornea (including the upper part) being composed of small ones (fig. 4 *a*) ; but on observing the position in which this insect holds its head, we arrive at the same result, viz. that the large facets receive the strongest light.

In the before-adduced instances of *Libellula vulgata* and *Scæva*

* Shuckard's Translation, p. 292.

selenitica, the cornea is distributed into facets of only two sizes, the transition from the one to the other being very *abrupt*, the consequence of which is, that there is some little irregularity in the disposition of the facets at the line of junction, and indeed some of them are necessarily *not hexagonal*, but of an irregular figure; this however, we may infer, does not affect the sight, as a circular lens may still be formed in them for the passage of the sight, as it is in the regular hexagonal facets, by means of the pigment which is distributed in the interstices, and about the circumference of all the facets, leaving only circular lenses for the transmission of the light. In several dipterous insects however, ex. *Volucella inanis*, there is a *gradual* transition from the large facets which form the upper and generally anterior part of the cornea, through facets regularly diminishing in size, down to the small ones, of which the lower and posterior part of the cornea is composed; yet, as in the former case of *Scæva selenitica*, where the singular distribution of the facets appears sufficiently accounted for by the form and general outline of the eye, so I think in the instance just cited, the *regular convex form* of the eye accounts for the *gradual* diminution of the facets: the more regular the curvature of the outline of the eye being, the more gradual the transition from the large to the small facets, and vice versâ. The only insect possessing a peculiarity in its cornea of this description, which I have particularly examined *alive*, so as to ascertain whether the eye in that state presents any peculiar appearance connected with the above, is the before-mentioned *Libellula*, and that presents a striking feature in the case; viz. the part of the cornea occupied by the large facets is of a reddish brown colour, and quite opaque, whilst the remainder of the eye (comprising the small facets) is of that light greenish colour and transparent nature, which every one is aware the eyes of many insects exhibit when alive. From this I infer, that in the case of such insects as the *Libellulæ*, whose prominent eyes are particularly exposed to the glare of the sunshine (in which they are most active and on the wing), the opacity and large size of the facets in the upper part of the eye modify the light admitted in that direction, which otherwise would confuse and dazzle the sight of the insect, and by analogy we may reasonably presume the same to be the case in the dipterous instances. Another observation presents itself—for as the rational presumption is that the sight of an insect's eye is more perfect in proportion to the greater number of facets into which it is divided, so the upper part of these insects' eyes must have a less perfect vision than the

lower, which is easily conceivable, because, further than as it may be essential for them to have a moderate power of vision *above them* to direct their course in their rapid flight, they cannot need so perfect a sight in that part of the eye, as the objects which more particularly require their notice, viz. their prey, food, &c. all occupy a situation level with or beneath their own, and thus are within the scope of the part of the eye most perfect in its sight, and comprehensive in its field of vision.

I have thus roughly thrown together my few remarks and ideas on this matter, in the hopes of eliciting some further information on the subject. The varying relative proportions of the facets in the eyes of different insects, in some the difference of size being so conspicuous, as in the instances of *Libellula vulgata* and *Scava selenitica* before adduced, whilst in others it is but just perceptible, and in a great majority does not exist at all, is exceedingly curious, and well deserves inquiry, which accurate observations on the living insects would most probably satisfy.

DESCRIPTION OF THE FIGURES.

Plate XXI.

Fig. 2. Cornea of *Libellula vulgata* magnified, and showing about the relative proportions of the facets; 2 *a*, longitudinal section or general outline of ditto from top to bottom of the eye; 2 *b*, transverse section of ditto from anterior to posterior part.

3. Cornea of *Scæva selenitica* magnified; 3 *a*, longitudinal section of ditto; 3 *b*, transverse section of ditto.

4. Front of the body of *Asilus crabroniformis*; 4 *a*, cornea of ditto magnified; *z*, the anterior edge of the eyes; *p*, the points of transition from the large to the minute facets.

XLIX. *On Insects and their Larvæ occasionally found in the Human Body. By the* Rev. F. W. Hope, *F.R.S. and Pres. Ent. Soc.*

[Read 3d April, 1837.]

In bringing this paper before the Society, one object is to set at rest a long disputed question as to whether true insects have been found in the human body. A second is, an anxious wish to render the science of Entomology practically useful. Instead of taking up the time of the members present with the conflicting

opinions held by different individuals, I openly assert the fact that insects, independently of *Entozoa*, do occasionally exist in the human body, in most cases being found in the larva state, but in some cases in the imago state, and I trust that the Tables placed before the meeting will most fully bear out that assertion.

The Tables are divided into thirteen Columns, and on the different divisions some few observations will be given. I hope, however imperfect they may appear, that others may be incited to add to them the result of their inquiries, and by an accumulated mass of evidence insure the attention of the medical profession, and thus assist its members in applying their science and skill to the mitigation and cure of some of the most afflicting diseases incident to human life.

The *First* Column presents those genera of insects which have been found in the body, amounting in number to twenty-three; and it may be here remarked that perfect insects have as yet only been observed belonging to one order, namely, the *Coleoptera*. They are the following genera: *Blaps*, *Tenebrio*, *Staphylinus*, and *Dermestes*.

The *Second* Column relates to larvæ which have been accurately ascertained, and I regret to state in several instances that various others have not yet been identified, or the number of cases produced on the present occasion would have been much more numerous. We have reason to think, from the rapid progress Entomology is making in Europe, that this will not long be a subject of complaint.

Third Column.—This division gives the numerous authorities for the different cases which have occurred. Among them we shall find persons of various countries, of all ranks and professions. Some instances are recorded by physicians and surgeons, many others by naturalists, and amongst the latter may be recorded the celebrated names of Linnæus, Olivier, Paykull, Rudolphi, Humboldt, Say, Germar, Spence and Kirby.

The *Fourth* Column relates to the countries where the occurrences took place, and we shall find in the New World, as well as the Old, the same general parasitic laws of nature. It is probable that some countries are liable to peculiar insectal diseases, but the cases relating to Great Britain and Ireland form, in my humble judgment, a body of evidence in proof of the occasional existence of these parasites in the human body which is quite irresistible.

The *Fifth* and *Sixth* Columns.—These two divisions give a re-

ference to the published accounts of different authors, and state where figures of the larvæ may be seen.

The *Seventh*, *Eighth* and *Ninth* Columns refer to the parts of the body affected by the disease, and to the sex and age of the individuals. In the majority of the cases adduced females and children appear to have been the sufferers.

The *Tenth* Column refers to the station in life of the individual.

The *Eleventh* adds the result of the disease, which often terminated fatally.

The *Twelfth* the date of the occurrence; and the last indicates the museum or collection in which the authentic specimens are deposited.

ADDITIONAL REMARKS.

The term *Scholechiasis* has been used by Messrs. Kirby and Spence for the diseases occasioned by the larvæ of insects generally. As, however, from the above Tables the diseases may distinctly be referred to three of the orders of insects, I suggest that the term *Canthariasis* be adopted for those which originate with Coleopterous larvæ; that *Myasis* (or the fly-disease) be given to those which originate in Dipterous larvæ; while *Scholechiasis* may be retained for those arising from Lepidopterous larvæ. It will naturally be expected in a paper like the present that some opinion should be stated respecting the manner in which the larvæ of insects enter the body. Now without entering minutely into this question, I merely speak on the point generally, leaving it for others to investigate the subject more fully and satisfactorily. In the first place, I am inclined to think many insects and their larvæ can endure and even thrive in a higher temperature than that of the human body; in proof of which I mention the *Blattidæ*, the house-cricket, and the larvæ of *Tenebrio molitor*, which commonly live about the fire-place, infesting our kitchens and bake-houses throughout the year: the latter indeed in the country being usually found under the hearth of the kitchen-grate, where they will rise to the surface, or burrow themselves in proportion to the degree of cold or heat by which they are affected.

The argument generally adduced, that the process of baking, roasting and boiling will destroy the ova or larvæ deposited in raw meat, I am inclined to think just. How, then, do living larvæ enter the body?

From an examination of the genera producing *Canthariasis* it appears not improbable that the insects deposit their ova in cold

dressed provisions; and as *Sphodrus*, *Blaps* and *Tenebrio* frequent the cellars of many of our houses, they at night, when in search of food, probably enter the larders and safes where provisions are kept, and deposit their ova in cheese, butter, bread, pastry, and even in cold meat. As to the larvæ of carnivorous *Coleoptera* entering the body, there is no need of any explanation here, as it is generally acknowledged they will attack dressed as well as undressed provisions. I therefore proceed to the consideration of the genera producing *Myasis*, or the fly-disease. There appears to be four different modes of accounting for it. First, the insects deposit their ova on the living person; secondly, they deposit them on dressed meat, and are taken with it into the stomach; thirdly, we sometimes swallow ova in too ripe fruit, or in unboiled vegetables, such as water-cresses and salads; and, fourthly, we may swallow ova as well as larvæ in impure and turbid water. *Scholechiasis* is probably occasioned also by swallowing raw vegetables on which eggs have already been deposited; at least one case appears clearly made out, namely, that of a young boy who had repeatedly eaten raw cabbage; the larvæ voided by the mouth appearing the same as the caterpillars of the common white cabbage butterfly (*P. Brassicæ*, Lin.)

In concluding these remarks, I beg leave publicly to thank several individuals present who have kindly given me their assistance by informing me of various cases, and for the loan, as well as exhibition, of specimens to illustrate my paper. I trust I may indulge the hope that some of the medical profession may be induced to devote part of their time and leisure hours to a study worthy of their skill and attention. Any assistance this Society can give I may promise will be cheerfully granted. The entomologist can name the insects which attack our persons, and detail their general habits and economy. To the medical profession we leave the discovery of antidotes adapted to relieve human suffering, and there will be a debt of gratitude due to those individuals who are fortunate enough to suggest remedies capable of mitigating and subduing the unparalleled tortures occasioned by insectal disease.

Figures 2, 3, 4, and 5, in Plate XXII., represent various larvæ obtained from the human subject contained in the Museum of the College of Surgeons.

Fig. 3 and 4 are closely allied to the larva of *Anthomyia canicularis* of Meigen, figured in Plate XV.

Fig. 5 evidently belongs to a species of *Œstridæ*.

Fig. 1 and 1 *a*, represent the larva of a species of the last-named family, which infests the rhinoceros, from the same Museum, whence it has been named *Œ. Rhinocerontis*, Owen.

TABLE I.—COLEOPTERA OR T

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Figu
CARABIDÆ.					
Sphodrus. ..	Leucophthalmus, Lin.	Paykull.	Sweden.	Upsal Transactions.	
DYTICIDÆ.					
Dyticus, Lin.	Marginalis, Lin.	Rev. F. W. Hope.	Middlesex.	Entomological Trans.	1
DERMESTIDÆ.					
Dermestes, Lin. 1.	Three hexapod larvæ. Perfect Insects.	Dr. Martin Lister.	England.	Phil. Trans. 1665, vol. x. p. 391 ; Shaw's Abr. vol. ii. p. 224.	
Case 2.	Murinus.	Otto.	England.	Otto's Comp. translated by South, vol. i. p. 79	
Case 3.	Lardarius.	Otto.	England.	Otto's Comp. translated by South, vol. i. p. 79.	
Case 4.	Lardarius.	Dr. Chichester.	Bath.	Edin. Journal, vol. vii.	
STAPHYLINIDÆ.					
Pæderus. ..	Elongatus, Fab. One example.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 116.	
Oxyporus. ..	Subterraneus, Fab. One example.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.	
Staphylinus. 1.	Splendens, Fab. Many specimens.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.	
Case 2.	Politus, Fab.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.	
Case 3.	Fuscipes, Fab. Very numerous.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.	
Case 4.	Punctulatus, Fab. Several specimens.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.	
SCARABÆIDÆ.					
Geotrupes. Ca. 1.	Vernalis.	Van Brommell.	Sweden.	Nova Acta Upsal. vol. vi. p. 99.	
Case 2.	Species unknown.	Rosen.	Sweden.	Nova Acta Upsal. vol. vi. p. 100.	
Melolontha. Ca. 1.	Species unknown.	Lemaout; Dr. Depalse.	France (?).	....	
Case 2.	Species unknown. Some larvæ.	Robin. Desvoidy.	France.	Journal de l'Institute.	
TENEBRIONIDÆ.					
Tenebrio. Case 1.	Molitor, Lin. Two grubs of meal-worm.	Dr. Bateman; Mr. Oswald Allen; Dr. Shaw.	Yorkshire.	Vide Edin. Med. et Sur. Journ. vol. vii. p. 43.	Vide vii
Case 2.	Molitor, Lin.	Mr. Oswald Allen.	Yorkshire.	Vide Edin. Med. et Sur. Journ. vol. vii. p. 44.	Vol.
Case 3.	Molitor, Lin. Two perfect insects.	Forestus.	Brielle.	Foresti Opera, lib. i. c. 51.	
Case 4.	Molitor, Lin. Two larvæ of.	Tulpius.	....	Tulpii Obser. Med. lib. ii. c. 51.	Tab.
Case 5.	Molitor, Lin.	Tulpius.	....	Tulpii, lib. iv. c. 12.	

Æ PRODUCING CANTHARIASIS.

fection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
ıch.	Female.	30 years.	Unknown.	Recovery.	1797.	....
st.	Female.	Adult.	....	Recovery.	1831 or 1832.	....
st.	Mary Jessop.	Adult.	Unknown.	....	....	....
ıs.	....	....	....	....	....	....
ıs.	....	....	....	....	....	....
ıch.	Mary Gardiner.	14 years.	....	Recovery.	1807.	....
ıch.	Female.	30 years.	....	Recovery.	1796.	....
ıch.	Female.	30 years.	....	Recovery.	1798.	....
ıch.	Female.	30 years.	....	Recovery.	1797.	....
ıch.	Female.	30 years.	....	Recovery.	1797.	....
ıch.	Female.	30 years.	....	Recovery.	1797.	....
ıch.	Female.	30 years.	....	Recovery.	1798.	....
ı (?).	Boy.	6 years.	....	....	1729.	Col. Nat. Hist. Soc. Societ. Upsal.
.	....	....	....	....	1752.	....
ıch.	....	Infant.	....	....	1817 or 1818.	Col. of Lemaout.
ıch.	Female.	....	....	....	....	Col. of Lemaout.
ıd Navel.	Female.	Young.	....	Death.	1811.	Col. of Dr. Bateman.
e.	....	....	....	Recovery.	1815.	Col. of Dr. Bateman.
ıch.	Female.	Young girl.	....	....	1568	....
ler.	Female.	50 years.	....	....	....	....
e.	Female.	....	....	Death.	....	....

TABLE I.—COLEOPTERA OR BEETLE PRODUCING CANTHARIASIS.

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Figure.	Affection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
CARABIDÆ.												
Sphodrus. ..	Leucophthalmus, Lin.	Paykull.	Sweden.	Upsal Transactions.		Stomach.	Female.	30 years.	Unknown.	Recovery.	1797.	....
DYTICIDÆ.												
Dyticus, Lin.	Marginalis, Lin.	Rev. F. W. Hope.	Middlesex.	Entomological Trans.		Chest.	Female.	Adult.	....	Recovery.	1831 or 1832.	....
DERMESTIDÆ.												
Dermestes, Lin. 1.	Three hexapod larvæ. Perfect Insects.	Dr. Martin Lister.	England.	Phil. Trans. 1665, vol. x. p. 391; Shaw's Abr. vol. ii. p. 224.		Chest.	Mary Jessop.	Adult.	Unknown.	....	....	....
Case 2.	Murinus.	Otto.	England.	Otto's Comp. translated by South, vol. i. p. 79		Anus.	....	....	....	....	....	....
Case 3.	Lardarius.	Otto.	England.	Otto's Comp. translated by South, vol. i. p. 79.		Anus.	....	....	....	....	....	....
Case 4.	Lardarius.	Dr. Chichester.	Bath.	Edin. Journal, vol. vii.		Stomach.	Mary Gardiner.	14 years.	....	Recovery.	1807.	....
STAPHYLINIDÆ.												
Pæderus. ..	Elongatus, Fab. One example.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 116		Stomach.	Female.	30 years.	....	Recovery.	1796.	....
Oxyporus. ..	Subterraneus, Fab. One example.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.		Stomach.	Female.	30 years.	....	Recovery.	1798.	....
Staphylinus. 1.	Splendens, Fab. Many specimens.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.		Stomach.	Female.	30 years.	....	Recovery.	1797.	....
Case 2.	Politus, Fab.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.		Stomach.	Female.	30 years.	....	Recovery.	1797.	....
Case 3.	Fuscipes, Fab. Very numerous.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi. p. 115.		Stomach.	Female.	30 years.	....	Recovery.	1797.	....
Case 4.	Punctulatus, Fab. Several specimens.	Paykull.	Sweden.	Nova Acta Upsal. vol. vi p. 115.		Stomach.	Female.	30 years.	....	Recovery.	1798.	....
SCARABÆIDÆ.												
Geotrupes. Ca. 1.	Vernalis.	Van Brommell.	Sweden.	Nova Acta Upsal. vol. vi. p. 99.		Throat (?).	Boy.	6 years.	....	....	1729.	Col. Nat. Hist. Soc. Societ. Upsal.
Case 2.	Species unknown.	Rosen.	Sweden.	Nova Acta Upsal. vol. vi. p. 100.		....	....	....	....	....	1752.	....
Melolontha. Ca. 1.	Species unknown.	Lemaout; Dr. Depalse.	France (?).	....		Stomach.	....	Infant.	....	....	1817 or 1818.	Col. of Lemaout.
Case 2.	Species unknown. Some larvæ.	Robin. Desvoidy.	France.	Journal de l'Institute.		Stomach.	Female.	....	....	....	....	Col. of Lemaout.
TENEBRIONIDÆ.												
Tenebrio. Case 1.	Molitor, Lin. Two grubs of meal-worm.	Dr. Bateman; Mr. Oswald Allen; Dr. Shaw.	Yorkshire.	Vide Edin. Med. et Sur. Journ. vol. vii. p. 43.	Vide cut.	Navel and Navel.	Female.	Young.	....	Death.	1811.	Col. of Dr. Bateman.
Case 2.	Molitor, Lin.	Mr. Oswald Allen.	Yorkshire.	Vide Edin. Med. et Sur. Journ. vol. vii. p. 44.	Vol.	Nose.	....	....	....	Recovery.	1815.	Col. of Dr. Bateman.
Case 3.	Molitor, Lin. Two perfect insects.	Forestus.	Brielle.	Foresti Opera, lib. i. c. 51.		Stomach.	Female.	Young girl.	....	....	1568	....
Case 4.	Molitor, Lin. Two larvæ of.	Tulpius.	....	Tulpii Obser. Med. lib. ii. c. 51.	Tab.	Bladder.	Female.	50 years.	....	....	....	....
Case 5.	Molitor, Lin.	Tulpius.	....	Tulpii, lib. iv. c. 12.		Nose.	Female.	....	....	Death.	....	....

TABLE I. *continued.*—COLEOPTERA OR

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Figs
TENEBRIONIDÆ.					
Tenebrio. Case 6.	Molitor, Lin.	Dr. Kellie.	Scotland.	Edinb. Med. et Surgical Journ. vol. vii. p. 48.	Dr. F
Case 7.	Molitor, Lin. Seven perfect insects and 50 larvæ.	Dr. Pickells; Dr. Thomson.	Ireland.	College Physic. Ireland, vol. v. p. 176.	Plat
Case 8.	Molitor, Lin.	Dr. Traill; Mr. Gleadow.	Lancashire.	....	
Case 9.	Molitor, Lin. Fifty examples.	Acrel.	Sweden.	Nova Acta Upsal. vol. vi. p. 100.	Nova plat
BLAPIDÆ.					
Blaps. Fab. Ca. 1.	Mortisaga, Fab. 1206 larvæ. Perfect Insect.	Dr. Pickells; Dr. Thomson; Dr. O'Brien.	Ireland.	Transac. Coll. Physic. in Ireland, vol. iv. p. 190.	Pla plat plat
Case 2.	Mortisaga, Fab.	Mr. Patterson.	....	Transac. Entom. Soc. of London, vol. ii. p. 99.	Plat
Case 3.	Mortisaga, Fab.	Dr. Bateman.	England (?).	Edin. Medical Journal, vol. vii.	Vol
MORDELLIDÆ.					
Mordella. Fab.	Species unknown.	Rosen.	Sweden.	Nova Acta Upsal. vol. vi. p. 100.	
CANTHARIDÆ.					
Meloe. Fab. Ca. 1.	Proscarabæus, Fab. Perfect Insect.	Germar.	Silesia.	Germar. Mag. vol. iv. p. 403.	
Case 2.	Species unknown.	Anonymous.	....	Scheff's Medic. Polizey, 2 Band, p. 185.	
Case 3.	Maialis? Fab.	Otto.	England.	....	
CIRCULIONIDÆ.					
Balaninus. Ca. 1.	Nucum, Fab.	Dr. Henry.	England.	Edin. Medical Journal, vol. vii.	Fig. iii.
Case 2.	Nucum, Fab.	Astley Cooper.	Middlesex.	....	Fig. iii.
Case 3.	Larvæ unknown.	Dr. Henry; J. Phillips, Esq.	Lancashire.	Edin. Medical Journal, vol. vii. p. 147.	
					D
DERMAPTERA.					
Forficula. Ca. 1.	Auricularia.	W. Griffin.	Ireland.	Medical Gazette, vol. xix. p. 48.	
Case 2.	Auricularia. Many examples.	W. Griffin.	Ireland.	Medical Gazette, vol. xix. p. 48.	

Æ PRODUCING CANTHARIASIS.

ection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved
nes.	....	....	....	....	....	....
ch.	Female.	....	....	Recovery.	....	....
ch.	Female.	....	....	Recovery.	....	Liverpool Museum.
ch.	Female.	30 years.	....	....	1796.	....
ch.	Mary Riordan.	28 years.	Dispensary patient.	Recovery.	1827.	....
.	....	....	....	....	....	....
ch.	....	....	....	....	....	....
ch.	....	....	....	....	1752.	....
	Susanna Schirm.	38 years.	....	Recovery.	15thMay,1816	....
(?).	....	Infant.	....	....	1778.	....
s(?).	....	....	....	....	....	....
t.	....	....	....	....	....	....
r canal.	Male.	....	In trade.	Recovered.	1805.	Collection of M. G.
ssages.	F——, Esq.	62 years.	Gentleman.	Partial recovery.	1809.	....
r canal.	Female.	Adult.	Dispensary patient.	....	1836.	....
t.	Male.	12 years.	Dispensary patient.	Recovery.	1836.	....

TABLE I. *continued.*—COLEOPTERA OR [illegible]VÆ PRODUCING CANTHARIASIS.

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Fig.	Affection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
TENEBRIONIDÆ. *Tenebrio.* Case 6.	Molitor, Lin.	Dr. Kellie.	Scotland.	Edinb. Med et Surgical Journ. vol. vii. p. 48.	Dr.	[illegible]ines.	....	....	....	....	....	....
Case 7.	Molitor, Lin. Seven perfect insects and 50 larvæ.	Dr. Pickells; Dr. Thomson.	Ireland.	College Physic. Ireland, vol. v. p. 176.	Ph	[illegible]ch.	Female.	....	....	Recovery.	....	....
Case 8.	Molitor, Lin.	Dr. Traill; Mr. Gleadow.	Lancashire.	....		[illegible]ch.	Female.	....	....	Recovery.	....	Liverpool Museum.
Case 9.	Molitor, Lin. Fifty examples.	Acrel.	Sweden.	Nova Acta Upsal. vol. vi. p. 100.	Nov	[illegible]ach.	Female.	30 years.	....	....	1796.	....
BLAPIDÆ. *Blaps.* Fab. Ca. 1.	Mortisaga, Fab. 1206 larvæ. Perfect Insect.	Dr. Pickells; Dr. Thomson; Dr. O'Brien.	Ireland.	Transac. Coll. Physic. in Ireland, vol. iv. p. 190.	P	[illegible]ach.	Mary Riordan.	28 years.	Dispensary patient.	Recovery.	1827.	....
Case 2.	Mortisaga, Fab.	Mr. Patterson.	....	Transac. Entom. Soc. of London, vol. ii. p. 99.	Ph	....	....	....	....	....	....	....
Case 3.	Mortisaga, Fab.	Dr. Bateman.	England (?).	Edin. Medical Journal, vol. vii.	Vol	[illegible]mach.	....	....	....	....	....	....
MORDELLIDÆ. *Mordella.* Fab.	Species unknown.	Rosen.	Sweden.	Nova Acta Upsal. vol. vi. p. 100.		[illegible]mach.	....	....	....	....	1752.	....
CANTHARIDÆ. *Meloe.* Fab. Ca. 1.	Proscarabæus, Fab. Perfect Insect.	Germar.	Silesia.	Germar. Mag. vol. iv. p. 403.		[illegible]	Susanna Schirm.	38 years.	....	Recovery.	15th May, 1816	....
Case 2.	Species unknown.	Anonymous.	....	Scherf's Medic. Polizey, 2 Band, p. 185.		[illegible]ch (?).	....	Infant.	....	....	1778.	....
Case 3.	Maialis? Fab.	Otto.	England.	....		[illegible]ines (?).	....	....	....	....	....	....
CIRCULIONIDÆ. *Balaninus.* Ca. 1.	Nucum, Fab.	Dr. Henry.	England.	Edin. Medical Journal, vol. vii.	Fig.	[illegible]best.	....	....	....	....	....	....
Case 2.	Nucum, Fab.	Astley Cooper.	Middlesex.	....	Fig.	[illegible]ary canal.	Male.	....	In trade.	Recovered.	1805.	Collection of M. G.
Case 3.	Larvæ unknown.	Dr. Henry; J. Phillips, Esq.	Lancashire.	Edin. Medical Journal, vol. vii. p. 147.		[illegible] passages.	F——, Esq.	62 years.	Gentleman.	Partial recovery.	1809.	....
						[illegible]RA.						
DERMAPTERA. *Forficula.* Ca. 1.	Auricularia.	W. Griffin.	Ireland.	Medical Gazette, vol. xix. p. 48.		[illegible]ary canal.	Female.	Adult.	Dispensary patient.	....	1836.	....
Case 2.	Auricularia. Many examples.	W. Griffin.	Ireland.	Medical Gazette, vol. xix. p. 48.		[illegible]roat.	Male.	12 years.	Dispensary patient.	Recovery.	1836.	....

TABLE II.—LEPIDOPTEROUS L.

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Figu
PAPILIONIDÆ.					
Pontia ..	Brassicæ, Lin.	Robert Calderwood, Surgeon.	Dalkeith, Scotland.	Medical Commentaries, vol. ix. p. 223.	
NOCTUIDÆ.					
Noctua. ..	Larvæ of.	Dumeril.	France.	Annales des Sciences.	
.... ..	Several larvæ.	Dr. Martin Lister.	England.	Philosoph. Transactions.	
Crambus. Ca. 1.	Pinguinalis.	Linnæus.	Sweden.	....	
Case 2.	Pinguinalis, larvæ of.	Mr. Church.	England.	Good's Study of Medic. vol. i. p. 307.	
Case 3.	Pinguinalis, larvæ of.	Fulvius Angelinus.	Ravenna.	Kirby and Spence, Ent. vol. i. p. 135.	
Phryganea. ..	Grandis.	Mr. Church.	England.	Good's Study of Medic. vol. i. p. 307.	

UCING SCOLECHIASIS.

ection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
canal.	Male.	Young boy.	....	Recovered	....	In Mr. Duncan's Collection.
.	....	....	....	....	Sept. 1830.	....
ch.	Male.	Boy.	....	....	....	....
ch.	....	....	....	....	....	....
ch.	....	....	....	....	1550.	....
ls.	Male.	Youth.	....	....	....	....
ch.	Female (?).	Child.	....	....	....	....

TABLE II.—LEPIDOPTEROUS [illegible]DUCING SCOLECHIASIS.

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Part affection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
PAPILIONIDÆ.											
Pontia ..	Brassicæ, Lin.	Robert Calderwood, Surgeon.	Dalkeith, Scotland.	Medical Commentaries, vol. ix. p. 223.	[illegible]stinary canal.	Male.	Young boy.	....	Recovered	....	In Mr. Duncan's Collection.
NOCTUIDÆ.											
Noctua. ..	Larvæ of.	Dumeril.	France.	Annales des Sciences.	...	....	....	....	....	Sept. 1830.	....
.... ..	Several larvæ.	Dr. Martin Lister.	England.	Philosoph. Transactions.	[illegible]omach.	Male.	Boy.	....	....	....	....
Crambus. Ca. 1.	Pinguinalis.	Linnæus.	Sweden.	....	[illegible]omach.	....	....	....	....	....	....
Case 2.	Pinguinalis, larvæ of.	Mr. Church.	England.	Good's Study of Medic. vol. i. p. 307.	[illegible]omach.	....	....	....	....	1550.	....
Case 3.	Pinguinalis, larvæ of.	Fulvius Angelinus.	Ravenna.	Kirby and Spence, Ent. vol. i. p. 135.	[illegible]ostrils.	Male.	Youth.	....	....	....	....
Phryganea. ..	Grandis.	Mr. Church.	England.	Good's Study of Medic. vol. i. p. 307.	[illegible]omach.	Female (?).	Child.	....	....	....	....

TABLE III.—DIPTEROUS L

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Fig
MUSCIDÆ.					
Musca. Case 1.	Larvarum, Lin.	Dr. Pickells; Dr. Thomson.	Ireland.	Trans. Coll. Physicians, vol. v. p. 172.	
Case 2.	Vomitoria.	Dr. Thomson.	Ireland.	Trans. Coll. Physicians, vol. v. p. 174.	
Case 3.	Cæsar (?).	Dr. Thomson.	Ireland.	....	
Muscidæ. Case 4.	Minute dipterous larvæ.	Dr. Thomson.	Ireland.	Trans. Coll. Physicians, vol. v. p. 174.	
Case 5.	Carnaria.	Roulin.	Asbornby, Lincolnshire.	Kirby and Spence, vol. i. p. 138.	
Case 6.	Carnaria.	Jules Cloquet.	....	....	
Case 7.	Carnaria.	Brera.	....	Bremser, p. 324.	Pla
Case 8.	Species unknown, 18 examples.	Wohlfart.	....	Annales de la Société Entom. p. 521.	A
Case 9.	Species unknown.	Dr. Latham.	England (?).	Medical. Transactions.	
Case 10.	Species unknown.	Mangles.	....	Owen Catalogue, 609, letter C.	
Case 11.	Species unknown.	Dr. Brooks.	England.	Owen Catalogue, 609, letter D.	
Musca. Case 12.	Domestica, 2 larvæ of.	Mr. Fourcault; Isidore Geoffroy.	France.	Echo du Monde, No. viii. p. 402.	
Case 13.	Domestica.	Ruyschius.	....	Thesau. Anatom. vol. i. p. 54.	
Case 14.	Species unknown, larvæ numerous.	Ruyschius; Valisneri.	....	Clark, Hist. Lumb. ch. xiii. p. 277.	Tabl Cl p.
Muscidæ. Ca. 15.	Larvæ unknown.	Rev. L. Jenyns.	Cambridge.	Trans. Ent. Soc. Lond. vol. ii. p. 152.	Pl. x
Case 16.	Species unknown, 50 larvæ	W. Sells, Esq.	Jamaica.	Entomolog. Trans. vol. i. part iii. Journ. p. 47.	
Case 17.	Larvæ unknown.	W. Sells, Esq.	Jamaica.	Entomolog. Trans vol. i. part iii. Journ. p. 47.	
Case 18.	Larvæ of.	W. Sells, Esq.	Jamaica.	Entomolog. Trans. vol. i. part iii. Journ. p. 47.	
Case 19.	Larvæ of a blue-fly, 235 specimens.	W. Sells, Esq.	Jamaica.	Entomolog. Trans. vol. i. part iii. Journ. p. 47.	
Musca. Case 20.	Domestica.	Brera.	....	Bremser, p. 324.	
Muscidæ. Ca. 21.	Species unknown, many small maggots.	Leuwenhoek.	....	Leuw. Epist. Oct. 17, 1687.	
Case 22.	Domestica, many maggots.	Dr. Reeve.	Norfolk.	Edin. Med. and Surg. Journ.	Dege pp.

UCING MYASIS.

ection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
ch.	Female.	....	....	....	1824.	....
ch.	Female.	....	....	....	....	....
ch.	Female.	....	....	....	....	....
ch.	Female.	....	....	....	....	....
ch.	John Page.	....	Pauper.	Death.	Jan.25th,1829	....
eyes.	Male.	....	....	....	....	....
ies.	....	....	....	....	....	....
inus.	Male.	Aged.	....	....	....	....
xillare.	Female.	....	....	....	....	....
inus.	....	....	....	....	....	In Coll. Chirurg.
	....	....	....	....	....	In Coll. Chirurg.
.	Male.	Infant.	....	....	....	....
næ.	Male.	....	Nobleman.	....	....	....
næ.	Male.	....	....	Cured.	.. .	....
	Male.	Adult.	Labourer.	Cured.	1836.	Collect. of Rev. L. Jenyns.
.	Male.	Young.	Gentleman.	....	18 .	....
nside of s.	Male.	Young.	Gentleman.	Death.	18 .	....
ear.	Male.	Young.	Gentleman.	Recovery.	18 .	....
nose.	Male.	Young.	Negro.	....	....	....
canal.	....	....	....	....	....	....
	Female.	....	....	Recovery.	1687.	....
	....	....	....	....	....	....

TABLE III.—DIPTEROUS LARVÆ PRODUCING MYASIS.

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	First affection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
MUSCIDÆ.											
Musca. Case 1.	Larvarum, Lin.	Dr. Pickells; Dr. Thomson.	Ireland.	Trans. Coll. Physicians, vol. v. p. 172.	...nach.	Female.	....	....	....	1824.	....
Case 2.	Vomitoria.	Dr. Thomson.	Ireland.	Trans. Coll. Physicians, vol. v. p. 174.	...nach.	Female.	....	....	....	....	....
Case 3.	Cæsar (?).	Dr. Thomson.	Ireland.	....	...nach.	Female.	....	....	....	....	....
Muscidæ, Case 4.	Minute dipterous larvæ.	Dr. Thomson.	Ireland.	Trans. Coll. Physicians, vol. v. p. 174.	...nach.	Female.	....	....	....	....	....
Case 5.	Carnaria.	Roulin.	Asboroby, Lincolnshire.	Kirby and Spence, vol. i. p. 138.	...nach.	John Page.	....	Pauper.	Death.	Jan. 25th, 1829	....
Case 6.	Carnaria.	Jules Cloquet.	....	....	...l eyes.	Male.	....	....	....	....	....
Case 7.	Carnaria.	Brera.	....	Bremser, p. 324.	Pha...tines.	....	....	....	....	....	....
Case 8.	Species unknown, 18 examples.	Wohlfart.	....	Annales de la Société Entom. p. 521.	A...sinus.	Male.	Aged.	....	....	....	....
Case 9.	Species unknown.	Dr. Latham.	England (?).	Medical. Transactions.	... maxillare.	Female.	....	....	....	....	....
Case 10.	Species unknown.	Mangles,	....	Owen Catalogue, 609, letter C.	...tal sinus.	....	....	....	....	....	In Coll. Chirurg.
Case 11.	Species unknown.	Dr. Brooks.	England.	Owen Catalogue, 609, letter D.	...	....	....	....	....	....	In Coll. Chirurg.
Musca. Case 12.	Domestica, 2 larvæ of.	Mr. Fourcault; Isidore Geoffroy.	France.	Echo du Monde, No. viii. p. 402.	...ock.	Male.	Infant.	....	....	....	....
Case 13.	Domestica.	Ruyschius.	....	Thesau. Anatom. vol. i. p. 54.	...orinæ.	Male.	....	Nobleman.	....	....	....
Case 14.	Species unknown, larvæ oumerous.	Ruyschius; Valisneri.	....	Clark, Hist. Lumb. ch. xiii. p. 277.	Tu...orinæ.	Male.	....	....	Cured.	.. .	....
Muscidæ. Ca. 15.	Larvæ unknown.	Rev. L. Jenyns.	Cambridge.	Trans. Ent. Soc. Lond. vol. ii. p. 152.	Pl......	Male.	Adult.	Labourer.	Cured.	1836.	Collect. of Rev. L. Jenyns.
Case 16.	Species unknown, 50 larvæ	W. Sells, Esq.	Jamaica.	Entomolog. Trans. vol. i. part iii. Journ. p. 47.	...hest.	Male.	Young.	Gentleman.	....	18 .	....
Case 17.	Larvæ unknown.	W. Sells, Esq.	Jamaica.	Entomolog. Trans vol. i. part iii. Journ. p. 47.	...ad inside of cheeks ...the ear.	Male.	Young.	Gentleman.	Death.	18 .	....
Case 18.	Larvæ of.	W. Sells, Esq.	Jamaica.	Entomolog. Trans. vol. i. part iii. Journ. p. 47.	...ad nose.	Male.	Young.	Gentleman.	Recovery.	18 .	....
Case 19.	Larvæ of a blue-fly, 235 specimens.	W. Sells, Esq.	Jamaica.	Entomolog. Trans. vol. i. part iii. Journ. p. 47.		Male.	Young.	Negro.	....	....	....
Musca. Case 20.	Domestica.	Brera.	....	Bremser, p. 324.	...nal canal.	....	....	....	....	....	....
Muscidæ. Ca. 21.	Species unknown, many small maggots.	Leuwenhoek.	....	Leuw. Epist. Oct. 17, 1687.	...leg.	Female.	....	....	Recovery.	1687.	....
Case 22.	Domestica, many maggots.	Dr. Reeve.	Norfolk.	Edin. Med. and Surg. Journ.	Dy...s.	....	....	....	....	....	....

TABLE III. *continued.*—DIPT

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Fig
MUSCIDÆ.					
Muscidæ. Ca. 23.	Flesh flies.	Azara.	Paraguay.	Azara, 216.	
Case 24.	Large blue fly, larvæ of.	Lempriere.	Jamaica.	Lemp. vol. ii. p. 182.	
Case 25.	Larvæ of flies.	Dr. Lempriere.	Jamaica.	Lemp. vol. ii. p. 182.	
Musca. Case 26.	Nigra, several examples of.	Dr. Wahlbom.	Sweden.	Edin. Medical Transac. vol. vii. p. 47.	
Case 27.	Carnaria.	Dr. Wahlbom.	Upsal.	Faun. Suec. 1105.	
Case 28.	Domestica, 12 specimens.	Dr. Babington.	England (?).	Edin. Medical Transac. vol. vii. p. 46.	
Case 29.	Domestica, numerous larvæ.	Bracy Clarke; Dr. Reeve.	Norwich.	Vide Dr. Bateman, Edin. Medic. Journ. vol. vii. p. 45.	V p
Case 30.	Larvæ of Muscidæ.	Tulpius.	....	Lib. ii. ch. 50.	Ta
Case 31.	Larvæ unknown, in myriads.	Dr. Pickells.	Ireland.	Trans. Coll. Phy. vol. iv p. 195.	Pla
Case 32.	Carnaria.	Dr. Cheyne.	Ireland (?).	Edin. Medical and Surg. Journ. vol. vii. p. 48.	Fig.
Case 33.	Carnaria (?).	Dr. Kellie.	Leith, Scotland.	Edin. Medical and Surg. Journ. vol. vii. p. 48.	Fig
Case 34.	Carnaria.	Dr. Bateman.	England (?).	Edin. Medical and Surg. Journ. vol. vii. p. 48.	Pla
Musca? Case 35.	Unknown larvæ, very numerous.	Dr. Chichester.	Somersetshire.	Edin. Medical and Surg. Journ. vol. vii. p. 326.	
Case 36.	Cibaria.	Dr. Good; Dr. White.	....	Edin. Medical and Surg. Journ. vol. i. p. 17.	
Case 37.	Cibaria, many larvæ.	Dr. White.	Somersetshire?	Mem. Med. Soc.	
Elophilus. Ca. 1.	Pendulus, Fab.	Bonnet.	Switzerland.	Bonnet, vol. x. p. 144.	
Case 2.	Pendulus, Fab.	Rev. W. Kirby.	England (?).	Philosoph. Mag. vol. ix. p. 336.	
Case 3.	Pendulus, Fab.	Acrel.	Sweden.	Nova Acta Upsal.	Vol.
Case 4.	Pendulus, Fab.	Odhelius.	Sweden (?).	Vetensk Acad. nya Handl. 1789.	
Case 5.	Pendulus, Fab.	Ziegler.	Italy (?).	Giornale Littera. der Pise.	Brer
Stratiomys. Ca. 1.	Species unknown, 3 different sized larvæ of.	Rev. F. W. Hope.	Norfolk.	....	
TIPULIDÆ. Ca. 1.	Apod larvæ.	Rev. W. Kirby.	Ipswich, Suffolk.	Kirby and Spence, Ent. vol. i. p. 139.	

E PRODUCING MYASIS.

ction.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
	....	....	....	Relieved.	....	....
, gums.	Female.	....	An officer's wife.	Death.	....	....
ne and	....	....	....	....	....	....
tomach.	Female.	Young girl.	....	....	....	....
h.	Female.	Girl.	....	Recovered.	....	....
n.	....	....	....	....	1832.	....
h.	Male.	....	Peasant.	....	1811.	In Collect. of Dr. Bateman.
h.	....	....	....	....	....	....
n.	Mary Riordan.	28 years.	Poor person.	Recovery.	1825.	....
es.	....	....	....	....	....	....
n.	....	....	....	....	....	....
s.	....	....	....	....	1811.	In Collect. of Dr. Bateman.
e.	Mary Gardiner.	14 years.	....	Recovery.	1811.	....
n.	....	....	....	....	....	....
anus.	....	30 years.	....	....	....	....
n.	Female.	....	....	....	....	....
n.	Female.	....	....	....	....	....
	....	....	....	....	....	....
	....	....	....	....	....	....
aria.	Female.	....	....	....	....	....
	Female.	12 or 13 yrs.	Cottager.	Recovered.	18—?	....
urine.	....	....	....	....	....	In Collect. of Mr. Kirby.

TABLE III. *continued.*—DIPTERÆ PRODUCING MYASIS.

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Fra…ction.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved.
MUSCIDÆ.											
Muscidæ. Ca. 23.	Flesh flies.	Azara.	Paraguay.	Azara, 216.	…rose.	....	....	....	Relieved.	....	....
Case 24.	Large blue fly, larvæ of.	Lempriere.	Jamaica.	Lemp. vol. ii. p. 182.	…th, gums.	Female.	....	An officer's wife.	Death.	....	....
Case 25.	Larvæ of flies.	Dr. Lempriere.	Jamaica.	Lemp. vol. ii. p. 182.	…me and …in.	....	....	....	....	....	....
Musca. Case 26.	Nigra, several examples of.	Dr. Wahlbom.	Sweden.	Edin. Medical Transac. vol. vii. p. 47.	…stomach.	Female.	Young girl.	....	....	....	....
Case 27.	Carnaria.	Dr. Wahlbom.	Upsal.	Faun. Suec. 1105.	…ach.	Female.	Girl.	....	Recovered.	....	....
Case 28.	Domestica, 12 specimens.	Dr. Babington.	England (?).	Edin. Medical Transac. vol. vii. p. 46.	…ach.	....	....	....	....	1832.	....
Case 29.	Domestica, numerous larvæ.	Bracy Clarke; Dr. Reeve.	Norwich.	Vide Dr. Bateman, Edin. Medic. Journ. vol. vii. p. 45.	…ach.	Male.	....	Peasant.	....	1811.	In Collect. of Dr. Bateman.
Case 30.	Larvæ of Muscidæ.	Tulpius.	....	Lib. ii. ch. 50.	Stomach.	....	....	....	....	....	....
Case 31.	Larvæ unknown, in myriads.	Dr. Pickells.	Ireland.	Trans. Coll. Phy. vol. iv p. 195.	Stomach.	Mary Riordan.	28 years.	Poor person.	Recovery.	1825.	....
Case 32.	Carnaria.	Dr. Cheyne.	Ireland (?).	Edin. Medical and Surg. Journ. vol. vii. p. 48.	Fæ…inces.	....	....	....	....	....	....
Case 33.	Carnaria (?).	Dr. Kellie.	Leith, Scotland.	Edin. Medical and Surg. Journ. vol. vii. p. 48.	Fo…ach.	....	....	....	....	....	....
Case 34.	Carnaria.	Dr. Bateman.	England (?).	Edin. Medical and Surg. Journ. vol. vii. p. 48.	Fæ…inces.	....	....	....	....	1811.	In Collect. of Dr. Bateman.
Musca? Case 35.	Unknown larvæ, very numerous.	Dr. Chichester.	Somersetshire.	Edin. Medical and Surg. Journ. vol. vii. p. 326.	…side.	Mary Gardiner.	14 years.	....	Recovery.	1811.	....
Case 36.	Cibaria.	Dr. Good; Dr. White.	....	Edin. Medical and Surg. Journ. vol. i. p. 17.	…mach.	....	....	....	....	....	....
Case 37.	Cibaria, many larvæ.	Dr. White.	Somersetshire?	Mem. Med. Soc.	…um, anus.	....	30 years.	....	....	....	....
Elophilus. Ca. 1.	Pendulus, Fab.	Bonnet.	Switzerland.	Bonnet, vol. x. p. 144.	…mach.	Female.	....	....	....	....	....
Case 2.	Pendulus, Fab.	Rev. W. Kirby.	England (?).	Philosoph. Mag. vol. ix. p. 336.	…ach.	Female.	....	....	....	....	....
Case 3.	Pendulus, Fab.	Acrel.	Sweden.	Nova Acta Upsal.	Va…	....	....	....	....	....	....
Case 4.	Pendulus, Fab.	Odhelius.	Sweden (?).	Vetensk Acad. nya Handl. 1789.	…	....	....	....	....	....	....
Case 5.	Pendulus, Fab.	Ziegler.	Italy (?).	Giornale Littera. der Pise.	…naria.	Female.	....	....	....	....	....
Stratiomys. Ca. 1.	Species unknown, 3 different sized larvæ of.	Rev. F. W. Hope.	Norfolk.	....	…t.	Female.	12 or 13 yrs.	Cottager.	Recovered.	18—?	....
TIPULIDÆ. Ca. 1.	Apod larvæ.	Rev. W. Kirby.	Ipswich, Suffolk.	Kirby and Spence, Ent. vol. i. p. 139.	…with urine.	....	....	....	....	....	In Collect. of Mr. Kirby.

Table III. *continued.*—DIPT

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Fig
Cuticola.					
Œstrus? Case 1.	Bovis, Lin.	Bracy Clark.	....	Lin. Transac. vol. iii. p. 323.	
Case 2.	Species unknown, 3 botts of.	Dr. Heysham	Carlisle (?).	Bateman, Med. Journ. vol. vii. p. 44.	Med i. fig
Case 3.	Numerous botts.	Dr. Chichester.	London.	Edin. Medical Journal, vol. vii. p. 328.	
Case 4.	Species unknown.	....	Demerara.	Loudon's Mag. vol. v. p. 483.	
Case 5.	Hominis, Curtis.	J. Howship, Esq. Mr. Gill.	Surinam.	Proceedings of Royal Soc. vol. iii. p. 181.	Fig
Case 6.	Hominis (?).	Treherne; J. Howship, Esq.	Maraquita, Colombia.	Proceedings of Royal Soc. vol. iii. p. 181.	Fig
Case 7.	Hominis.	Linne, the younger; Gmelin.	....	Letter to Pallas; Gmelin's Syst. 13.	
Case 8.	Species unknown.	Say, and Dr. Brick.	Philadelphia.	Trans. Acad. Nat. Sci. Philad. vol. ii.	
Case 9.	Species unknown.	Roulin.	Maraquita, Colombia.	Ent. Trans. de France, vol. ii. p. 523.	
Case 10.	Species unknown.	Roulin.	....	Ent. Trans. de France, vol. ii. p. 524.	
Case 11.	Species unknown.	Vallot.	Doubtful.	Ent. Trans. de France vol. ii. p. 525.	
Case 12.	Species unknown.	Arture.	Cayenne.	Mém. Acad. Sci. Paris. 1753.	
Case 13.	Species unknown.	Guerin; Dr. Guion.	Martinique.	Ent. Trans. de France, vol. ii. p. 526.	
Case 14.	Species unknown (?).	Goudout.	America.	Ent. Trans. de France, vol. ii. p. 527.	
Case 15.	Species unknown (?).	Anonymous.	Peru.	Percheron, tom. ii. p. 201.	
Case 16.	Hominis, Oliv.	Olivier.	South America.	Ency. Method. tom. viii. p. 468.	
Case 17.	Hominis, Lin.	Rudolphi.	Prussia (?).	....	
Case 18.	Guildingii, Hope.	LansdowneGuilding.	Trinidad.	Owen's Catalogue.	Fig.
Case 19.	Species unknown, 2 larvæ of.	Metaxa.	....	Zool. Medical, Octa, 1835.	Fig
Case 20.	Species unknown.	Mr. Clift.	.. .	....	

E PRODUCING MYASIS.

ction.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved
.	Female.	....	....	Death.	1687.	....
n.	Male.	....	....	Recovery.	....	....
ch.	Male.	....	Captain.	Recovered.	1811.	....
	Male.	....	Sailor.	Recovered.	1830.	....
la.	Male.	....	Soldier.	Recovered.	1806.	....
n.	Male.	Young.	Carpenter.	Recovered.	1832.	In Collect. of Mr. Howship.
lomen.	....	....	....	Death.	....	....
	Male.	....	....	....	....	....
m.	Male.	....	....	Relieved.	1827.	....
velu de ne.	Male.	....	....	....	Of late occurrence.	....
	Male (?).	....	....	....	....	....
	....	....	....	....	....	....
he body.	Male.	....	Negro.	....	....	....
	Male.	....	....	....	....	....
	Male.	....	....	....	....	....
of abdo-	Male.	....	....	....	....	....
	....	....	....	....	....	....
d.	Male.	....	....	....	....	In Coll. Chirurg.
	....	....	Peasant.	....	....	....
	....	....	....	....	....	In Col. J. Keate, Surg. Gen.

TABLE III. *continued.*—DIPTE

Family and Genus.	Larval Species.	Authority.	Country.	Reference.	Figures.
CUTICOLA.					
Œstrus? Case 1.	Bovis, Lin.	Bracy Clark.	....	Lin. Transac. vol. iii. p. 323.	
Case 2.	Species unknown, 3 botts of.	Dr. Heysham	Carlisle (?).	Bateman, Med. Journ. vol. vii. p. 44.	Med. i. p. fig.
Case 3.	Numerous botts.	Dr. Chichester.	London.	Edin. Medical Journal, vol. vii. p. 326.	
Case 4.	Species unknown.	....	Demerara.	Loudon's Mag. vol. v. p. 483.	
Case 5.	Hominis, Curtis.	J. Howship, Esq. Mr. Gill.	Surinam.	Proceedings of Royal Soc. vol. iii. p. 161.	Fig.
Case 6.	Hominis (?).	Treherne; J. Howship, Esq.	Maraquita, Colombia.	Proceedings of Royal Soc. vol. iii. p. 161.	Fig.
Case 7.	Hominis.	Linne, the younger; Gmelin.	....	Letter to Pallas; Gmelin's Syst. 13.	
Case 8.	Species unknown.	Say, and Dr. Brick.	Philadelphia.	Trans. Acad. Nat. Sci. Philad. vol. ii.	
Case 9.	Species unknown.	Roulin.	Maraquita, Colombia.	Ent. Trans. de France, vol. ii. p. 523.	
Case 10.	Species unknown.	Roulin.	....	Ent. Trans. de France, vol. ii. p. 524.	
Case 11.	Species unknown.	Vallot.	Doubtful.	Ent. Trans. de France vol. ii. p. 525.	
Case 12.	Species unknown.	Arture.	Cayenne.	Mém. Acad. Sci. Paris. 1753.	
Case 13.	Species unknown.	Guerin; Dr. Guion.	Martioique.	Ent. Trans. de France, vol. ii. p. 526.	
Case 14.	Species unknown (?).	Goudout.	America.	Ent. Trans. de France, vol. ii. p. 527.	
Case 15.	Species unknown (?).	Anonymous.	Peru.	Percheron, tom. ii. p. 201.	
Case 16.	Hominis, Oliv.	Olivier.	South America.	Ency. Method. tom. viii. p. 468.	
Case 17.	Hominis, Lin.	Rudolphi.	Prussia (?).	....	
Case 18.	Guildiugii, Hope.	LaosdowneGuilding.	Trinidad.	Owen's Catalogue.	Fig.
Case 19.	Species unknown, 2 larvæ of.	Metaxa.	....	Zool. Medical, Octa, 1835.	Fig.
Case 20.	Species unknown.	Mr. Clift.	.. .	....	

LARVÆ PRODUCING MYASIS.

Local Affection.	Sex or Name.	Age.	Station in Life.	Result.	Date of Occurrence.	Specimens preserved
Jaws.	Female.	....	....	Death.	1667.	....
Antrum.	Male.	....	....	Recovery.	....	....
Stomach.	Male.	....	Captain.	Recovered.	1811.	....
Arm.	Male.	....	Sailor.	Recovered.	1830.	....
Scapula.	Male.	....	Soldier.	Recovered.	1806.	....
Scrotum.	Male.	Young.	Carpenter.	Recovered.	1832.	In Collect. of Mr. Howship.
of abdomen.	....	....	....	Death.	....	....
Leg.	Male.	....	....	....	....	....
Scrotum.	Male.	....	....	Relieved.	1827.	....
Le chevelu de Chomme.	Male.	....	....	....	Of late occurrence.	....
....	Male (?).	....	....	....	....	....
....	....	....	....	....	....	....
of the body.	Male.	....	Negro.	....	....	....
....	Male.	....	....	....	....	....
....	Male.	....	....	....	....	....
skin of abdomen.	Male.	....	....	....	....	....
....	....	....	....	....	....	....
Head.	Male.	....	....	....	....	In Coll. Chirurg.
Ear.	....	....	Peasant.	....	....	....
....	....	....	....	....	....	In Col. J. Keate, Surg. Gen.

ERRATA AND ADDENDA.

Page 15, last line, *for* "Curvon," *read* "Curzon."

22. Mr. A. White informs me, that a specimen of *Eucerocoris nigriceps* is in the British Museum Collection from Sierra Leone. (J.O.W.)

35, line 26, *for* "Patersonii," *read* "Pattersonii."

42, line 18, *for* "labrum," *read* "labium."

line 32, *after* "Olivier," *add* "but incorrectly."

43, line 3, *for* "castaneum," *read* "castanea."

line 36, *for* "scutellatus rufus," *read* "scutellata, rufa."

44, line 6, *read* "scutellata, rufa."

line 13, *read* "scutellata."

line 23, *read* "castanea."

line 27, *for* "Mexicansis," *read* "Mexicanis."

line 34, *read* "scutellata, castanea."

54, line 23, *for* "flavus," *read* "flavum."

82, line 5, *for* "niger, opacus," *read* "nigra, opaca."

96, line 7, *for* "Andouin," *read* "Audouin."

97. A fourth species of *Trochoideus* has recently been published in Guérin's Revue de Zoologie for 1840, under the name of *Tr. rufus*.

100, line 25, *for* "Halliday," *read* "Haliday."

127. *Add*, after line 5, "And see further in Mag. Nat. Hist. No. 9, September, 1837."

149. A species of *Castnia* is described by Mikan in "Deliciæ Floræ et Faunæ Brasiliensis," Vindob. 1825, fol., under the name of *Castnia Schreibersii*.

164, line 32, *for* "inserti," *read* "insertæ."

line 33, *for* "ten," *read* "thirteen."

Journal of Proceedings, p. 6, last line, *for* "*Clavaria Larvarum*," *read* "*Sphæria Robertsii*, vol. i. pl. 11."

LONDON:

PRINTED BY C. ROWORTH AND SONS, BELL YARD,

TEMPLE BAR.

TRANSACTIONS

OF

THE ENTOMOLOGICAL SOCIETY

OF LONDON.

Vol. I. Part I. 1834, with seven plates, price 7*s.* 6*d.*—to members 5*s.* 6*d.*
Vol. I. Part II. 1835, with six plates, price 7*s.* 6*d.*—to members 5*s.* 6*d.*
Vol. I. Part III. 1836, with eleven plates, price 10*s.* 6*d.*—to members 8*s.* 6*d.*

Vol. II. Part I. 1837, with eight plates, price 8*s.*—to members 6*s.*
Vol. II. Part II. 1838, with four plates, price 4*s.* 6*d.*—to members, 3*s.* 6*d.*
Vol. II. Part III. 1839, with five plates, price 5*s.*—to members 3*s.* 6*d.*
Vol. II. Part IV. 1840, with five plates, price 6*s.*—to members 4*s.* 6*d.*

Mr. G. Newport's Prize Essay upon *Athalia centifoliæ*, or the Black Caterpillar of the Turnip. With one plate. Price 1*s.*

Address upon the Recent Progress and Present State of Entomology. By J. O. Westwood, F.L.S. &c. Price 1*s.*

JOURNAL OF PROCEEDINGS.

February 1*st*, 1836.

The Rev. F. W. Hope, F.R.S., President, in the Chair.

Donations.

Wollf, Icones Cimicum, 4to.

The Plates to Swammerdam's Book of Nature, folio. Both presented by the Rev. F. W. Hope.

Insecta Suecica. Coleoptera, 4 vols. 8vo. Presented by Leonard Gyllenhal, For. Hon. M. E. S., the Author thereof.

Dispositio Systematica Curculionidum, 1 vol. 8vo.; and

Synonymia Insectorum Curculionidæ, vol. 2, p. 1. Both presented by J. C. Schönherr, For. Hon. M. E. S., the Author thereof.

The Athenæum. Parts for December and January. By the Editor.

Proceedings of the Royal Asiatic Society for January, 1836. By that Society.

No. 58 of the Magazine of Natural History. By the Editor.

Memoir on the Supposed Existence of Metamorphoses in the Crustacea. By J. O. Westwood. (From the Philosophical Transactions.)

Specimens of 69 Species of Hymenopterous and Dipterous Insects described in the Entomological Magazine. By A. H. Haliday, Esq.

Specimens of Amycterus Schönherri and Prionus pilosicollis. By the President.

A Cabinet of 14 Drawers. Presented by Samuel Hanson, Esq., to whom the thanks of the Society were directed to be specially given for such donation.

Richard Taylor, Esq., F. R. S., &c., of Red Lion Court, Fleet Street, was elected an Ordinary Member of the Society; and

Dr. Berendt, of Dantzig,

Dr. Beck, of Copenhagen,

M. le Capitaine François De Villiers, of Chartres,

M. Van Roser, of Stuttgard,

Dr. Lehmann, of Hamburgh,

Dr. Nees Von Esenbeck, of Breslau, and

M. le Marquis Maximilian Spinola, of Turin,

were elected Ordinary Foreign Members of the Society.

The President nominated Dr. Horsfield, Lieut. Col. W. H. Sykes, W. W. Saunders, and William Yarrell, Esqs. to act as Vice-Presidents for the year ensuing.

Exhibitions, Memoirs, &c.

The President exhibited a small nest of a species of *Termitidæ*, or White Ants, about a foot in height, of a pitcher shape, solid earthy texture and black colour. Communicated from Fernando Po, by Captain H. Downes, M. E. S.

Also two spherical case fuzes half eaten by the Wood Ant of Barbadoes, the brown paper, string and composition of which they are formed remaining unhurt. Communicated from the Royal Naval and Military Museum, to which they had been presented by Lieut. Col. Birch.

Also a large nut from the banks of the river Amazon, the interior of which had been devoured by an insect which proved, on opening the nut, to be a species of *Upis*, a genus whose economy had not hitherto been noticed.

Mr. Desvignes exhibited two remarkable varieties of the *Melitææ selene* and *artemis*, captured upon the Malvern Hills, and near Ipswich.

Mr. Westwood exhibited specimens of the German *Gryllus ephippiger*, and noticed the remarkable structure of the posterior part of the prothorax in the males, which was elevated into a concave dome or sounding-board, a structure evidently intended for the increase of the sound produced by the friction of the wing covers, which in this species are very small.

Mr. Edwin Lees exhibited specimens of a species of wasp, from the neighbourhood of Worcester, which had been considered to be the *V. vulgaris*, but of which the nest is of a very large size, and unlike that of the ordinary species, built on the beams of houses

under the roof. Notwithstanding this difference of habits, the specimens were regarded by Mr. Stephens to be the *V. vulgaris*.

The same gentleman also exhibited a large piece of an oak beam from the floor of a flour-mill near Cladbury, completely perforated in every direction, as it was supposed, by the larvæ of the *Tenebrio molitor*, great numbers of which were also exhibited on breaking off a piece of the wood. A specimen of *Trogosita mauritanica* was also discovered in one of the burrows. It was observed, however, that the perforations were very irregular, and not cylindrical, as is ordinarily the case with wood-boring insects, which circumstance, together with the unusual locality of these meal-eating species, induced some of the members present to doubt whether the injury were in fact caused by the meal-worm, which, in this case, must evidently have had such a supply of its ordinary food as not to have experienced any inducement to resort to the hard wood of an oaken beam for its support. Mr. Hope suggested that the devastation had much more the appearance of the work of a colony of ants, which had probably established themselves beneath the floor; whilst Mr. Westwood contended, in the absence of the imago, that even were the injury produced by these larvæ, they were rather to be attributed to *Helops violaceus* than *Tenebrio molitor*, which closely resemble each other in the larva state, and he mentioned the circumstance recorded by Mr. Paget in his recent work upon the Natural History of Yarmouth, of a window-frame having been entirely devoured by a colony of the larvæ of *Helops violaceus*. Mr. Bainbridge also stated that he had found the last-named insect, both in the larva and imago states, in a fir-post on Plumstead Common.

Mr. Hilton inquired as to the practical advantages likely to arise, by the employment of Kyan's solution for steeping wood, in preventing the attacks of insects upon the wood work of houses in a manner similar to that now exhibited.

The following memoirs were read:

"Monograph upon the Hemipterous genus *Myocoris*." By Dr. Hermann Burmeister.

"Notice of the Manner in which the Larva of *Sirex juvencus* perforates the solid Wood of Fir-Trees." By W. Sells, Esq.

"Description of the Larva of *Blaps mortisaga*." By A. H. Haliday, Esq., M.A.

"Description of a New Genus of Dipterous Insects from New South Wales." By J. O. Westwood, F.L.S.

"Notice of the Capture of a Locust near Ardmore, in Ireland,

in September last, measuring five inches across the wings." By Miss M. Ball, of Youghall.

" On the Habits of the Turnip Fly, illustrated by Experiments." By J. S.

The President, in allusion to the Memoirs of Mr. Sells and J. S., stated that *Sirex gigas* had been very destructive to fir-trees at Ealing, Middlesex, and, with respect to the proposed use of sulphur against the Turnip Fly, that this material would not be serviceable, as he had noticed on the coast, that insects swarmed abundantly in places covered with *Pyrites*.

March 7th, 1836.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Annales de la Société Entomologique de France, 1835, part 3. Presented by that Society.

Transactions of the Zoological Society of London, Vol. I. parts 1 to 4. Presented by that Society.

Magazine of Popular Science, No. 1. By the Society for the Diffusion of Practical Science.

Proceedings of the Berwickshire Naturalists' Club for 1835. By that Society.

Journal of the Society of Natural History of Boston, Nos. 1 & 2. By that Society.

Catalogue Raisonné des Objets de Zoologie récuillies en Caucase. Presented by M. Menetries, the Author thereof.

Descriptions of three new Species of *Cremastocheilus*. By T. W. Harris, M. D., Librarian of Harvarden University. Presented by the Author thereof.

Coleoptera Europæ Dupleta. Presented by Messrs. Villa, the Authors thereof.

Twenty-one Numbers of the Magazine of Natural History. Presented by the Rev. F. W. Hope.

No. 59 of the same work. By the Editor.

Nos. 17 and 18 of Burmeister's Manual of Entomology, translated by W. E. Shuckard. Presented by the latter.

Ludolphi, De Locustis. Presented by W. Pamplin.

Frederick Holme, Esq., M.A., Corpus Christi Coll., Oxford, and
William Knott, Esq., of Wimburne, Dorset,
were elected Ordinary Members of the Society; and
M. Von Winthem, of Hamburgh,
M. Frivaldszki von Frivald, of Perth in Hungary,
M. Menetries, of St. Petersburgh,
M. Dupont, of Paris, and
M. Robert, of Liege,
were elected Foreign Ordinary Members of the Society.

Exhibitions, Memoirs, &c.

J. G. Children, Esq., exhibited a specimen of a Mexican Coleopterous insect, recently obtained by him, and which he regarded as the Kanguroo Beetle *(Scarabæus macropus)* of Francillon; likewise two specimens of *Chrysina Mexicana*, figured in Griffith's Animal Kingdom, which he considered as the females of the former. Some doubts, however, existed as to the specific identity of the former, which he promised to solve by an examination of Francillon's original specimen in the cabinet of Mr. Mac Leay.

Mr. Westwood exhibited five new species of *Paussidæ*, forwarded to him by M. Gory, of Paris. Also some heads of poppies attacked by one of the *Cynipidæ*. The interior of the seed vessels was found to be completely transformed into a solid dry porous substance, in which the larvæ and pupæ of the *Cynips* were found.

The same member also exhibited specimens of a Geometrideous larva, found on a grass-covered sandy bank between the promontory of Fairhead and the town of Ballycastle, Ireland, in such profusion, that they might be collected by handfuls; every stem and leaf of grass was alive with them, twisted into endless variety of grotesque forms, or hanging suspended by their threads. He desired information as to the species of moth of which these might be the larvæ.

The Rev. F. W. Hope exhibited specimens of a new species of *Chalcis*, belonging to the sub-genus *Brachymeria*, parasitic upon the pupa of an East Indian butterfly of the genus *Euplœa*, specimens of which latter in the chrysalis state were also exhibited. Twenty-one individuals of the *Chalcis* appeared to have been produced from one chrysalis. Figures of this *Chalcis*, which Mr. Hope proposed to name Chalcis *(Brachymeria) Euplœæ*, and of the chrysalis from which they were produced, are represented in plate II. fig. 9 and 10.

*Chalcis (Brachymeria) Euplœæ.**

Nigra, pubescens, thorace et capite punctatis, abdomine lævi nitido, tegulis flavis; pedibus 4 anticis flavis, femoribus duobus anticis ad basin, intermediis totis (apice excepto) nigris; pedibus posticis, coxis, trochanteribus et femoribus nigris, his ad apicem extremum externe et interne flavis; tibiis flavis, basi extremo nigricanti; tarsis flavis, pulvillis fuscis, femoribus posticis dentibus circiter 10 minutis subtùs armatis.

Long. corp. lin. 2. Exp. alar. lin. $3\frac{1}{2}$. (J. O. W.)

The same member also exhibited a large Curculionideous insect from Brazil, from between the prothorax and elytra of which two very long and clavate fungi had been produced, one of which was entire, the other branched. A figure of this insect is given in plate III. fig. infer.

Mr. Children exhibited specimens of a caterpillar from New Zealand, from the back of the neck of which a long dry vegetable protuberance had been produced, accompanied by the following notice respecting it :—" The grub of New Zealand, in appearance resembling that of a large caterpillar. It lives entirely on the sweet potato (*Convolvulus Batatas, L.*, or *Kumera* of the New Zealanders). During the season it continues healthy and active, but ultimately dies; it retains its natural appearance, but becomes dry and hard, when an appendage sprouts from its tail, from four to six inches long, resembling a small twig." With the view of exciting inquiry into the particulars of the growth of this vegetable, which was believed both by Messrs. Robert Brown and J. Bennett to be most probably a species of *Clavaria*,† he mentioned that O. F. Muller had published a memoir on the subject of vegetable excrescences found upon animals, all of which, however, were dead at the time of their discovery; but that Dr. Mitchell had published a paper in Silliman's American Journal, in which he stated that he had noticed many similar instances, especially in a wasp's nest, the larvæ of which were not full grown, but that incipient vegetation had commenced in the bodies of these larvæ, which, however, continued growing, as well as the vegetable substance within their bodies, until the latter burst out and killed the

* Dr. Klug has described and figured another but very different species of *Chalcis*, under the name of *C. albicrus*, produced from the pupa of another species of *Euplœa* (*E. Chrysippus*) in the *Symbolæ Physicæ. Insects*, pl. 37, fig. 9. Say also obtained *Chalcis amœna* from the pupa of a *Thecla* (*Journ. Boston N. H. Soc.* 1, 271), and Giorna *Chalcis minuta* from *Zygæna filipendulæ* (*Calend. Ent.* p. 119.)—(J. O. W.)

† Since published by Sir W. Hooker, in his *Icones Plantarum*, under the specific name of *Clavaria Larvarum*.

larvæ subsequently to its attaining its size. The circumstance of the growth of mould on the outside of living chrysalides was also mentioned, as proving that it was not essential that the animals should be dead, and also that the introduction of the germs of a plant (as grains of oats) or the larvæ of *Œstridæ*, into the stomach of an animal, had not the effect of destroying their vital properties, and, therefore, that it was not contrary to nature that the *Clavariæ* found upon these caterpillars had grown within their bodies whilst still living.*

The following memoirs were read:

"On the Golofa Beetle of Venezuela (exhibited at a former meeting of the Society) and other allied Species." By the Rev. F. W. Hope, President.

"Notice of the Explosive Properties of *Brachinus crepitans*, observed a considerable period of time after the death of the insect." By Frederick Holme, Esq., M. A. The individuals observed by the writer were taken in March, 1834, at Meysey Hampton, near Fairford, Gloucestershire. They crepitated freely when seized, some much more so than others; when thrown into spirits of wine they continued their discharges with great vehemence, as long as they were alive, the vapour escaping in bubbles from the surface. They are almost invariably found in company with *Anchomenus prasinus*, which may have occasioned the erroneous idea that the latter insect also possesses the power of crepitation. "But the most extraordinary fact relative to the discharge is, that it may be produced after death by pressing the abdomen near the anus. I discovered this by accident in attempting to set the wings of some specimens which had been dead eighteen hours, when one gave fifteen, and another nineteen discharges before it was exhausted. I afterwards obtained discharges from specimens dead four days, which had been set and pierced with pins, but most of these only discharged a black grainy fluid, without smoke, along with the noise. I took a specimen of *Br. immaculicornis* among the above, but it did not appear specifically distinct."

"Description of a new Species of Water-Beetle from Cambridgeshire." By C. C. Babington, Esq., M.A., F.L.S. (Published in the last part of the Transactions.)

* The facts subsequently observed relative to the disease to which silk-worms are subject, named *Muscardine*, arising from the development of minute fungi in the bodies of those insects, throw great light upon this curious question. Numerous analogous instances are collected together in the second volume of the Natural History of Insects, published by Murray two or three years ago.—Sec. E. S.

" Descriptions of new and Notes upon other Orthopterous Insects." By G. R. Gray, Esq. (Since published by the Author in the Magazine of Natural History.)

" Observations upon the Economy of a South American Species of the Coleopterous Genus *Upis*, with a few Remarks upon the Habits of Carpophagous Insects in general." By J. O. Westwood, F.L.S.

The President mentioned the intended publication of a Portrait of the late A. H. Haworth, Esq., F.L.S., &c., and invited subscriptions for proof impressions of the same.

April 4th, 1836.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Annales de la Société Entomologique de France, 1835, No. 4. Presented by that Society.

Genera et Species *Curculionidum*, Vol. II. part 2. Presented by J. C. Schönherr, For. Hon. M. E. S., the Author thereof.

A Catalogue of a Collection of Insects presented to the Queen, printed at Frogmore Lodge in 1810. By the Princess Charlotte. Presented by L. Dillwyn, Esq., M. P.

Catalogue of the Coleopterous Insects of Swansea. By L. Dillwyn, Esq., M. P., the Author thereof.

The Athenæum for March, 1836. By the Editor.

A Letter on the British Museum. By Edward Edwards, the Author thereof.

No. 60 of the Magazine of Natural History. Presented by the Editors.

T. J. Ewing, Esq., of Sydney, Van Diemen's Land,
M. P. Graells, of Barcelona, Spain,
M. Fahræus, Governor of the District of Gottenburg, Sweden, Chevalier of the Polar Star, &c.
M. le Baron Maximilian de Chaudoir, of Kiew, Dorpat, in Livonia, and
M. le Baron Ocksay de Ockso, Privy Councillor of Austria, Memb. Nat. Hist. Soc. Moscow, and of the Acad. Cæs. Leopol. Carol. Nat. Curios.,

were elected Foreign Ordinary Members of the Society.

Memoirs, Exhibitions, &c.

"Observations and Experiments for excluding the House and other Flies from Apartments." By the Rev. Edward Stanley, now Lord Bishop of Norwich.

"Description of a New Crustaceous Animal from the Mauritius." By Robert Templeton, Esq., R. A., Corr. Memb. Nat. Hist. Soc. Belfast.

"Notes on the Habits of *Osmia atricapilla*." By Mr. G. R. Waterhouse.

"Description of Six New East Indian *Coleoptera*." By W. W. Saunders, Esq., F. L. S., &c.

Mr. Pickering exhibited two living specimens of *Andrenæ* stylopized, which he had recently captured. He also read a list of the species of *Andrena* ascertained by him to have been attacked, the number whereof amounted to eighteen.

May 2d, 1836.

Col. W. H. Sykes, F. R. S., Vice-President, in the Chair.

Donations.

Nos. 81 and 82 of Illustrations of British Entomology. Presented by J. F. Stephens, Esq., the Author thereof.

Récherches Anatomiques sur les *Coléoptères*; and

Recherches Anatomiques sur les *Hémiptères*. Both by M. Léon Dufour, For. M. E. S., the Author thereof.

The Athenæum, Part for April. By the Editor.

Description of *Leptura Silbermann*. By M. A. Lefebvre, Hon. For. M. E. S., the Author thereof.

Description de l'Etablissement Geographique de Bruxelles. By M. Ph. Van der Maelen.

Supplementum *Coleopterorum* Europæ Dupletorum. By M. Villa.

No. 6 of the Journal of the Bahama Society for the Diffusion of Knowledge. By that Society.

No. 61, Magazine of Nat. History. By the Editor.

Say, Descriptions of New Species of *Curculionites*. Presented by J. E. Bicheno, Esq.

Magasin de Zoologie, Bulletin, Nos. 3, 4, 5. Purchased by the Society.

M. Roger, of Bourdeaux, was elected a Foreign Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

W. Raddon, Esq. exhibited a large collection of North American insects, which he had obtained from the skimmings of raw turpentine (in which they had become entangled) whilst under preparation for use in this country, and then placed in spirits of turpentine to cleanse them thoroughly, including numerous *Caribidæ*, *Scaritidæ*, *Elateridæ*, *Lamellicornes*, &c. together with a remarkable hermaphrodite, *Lucanus Camelus*, Fabr.

M. Ingpen exhibited specimens of *Tinea cloacea*, together with their pupæ, which had been reared from a large fungus growing upon a cedar tree, the heads of the pupæ being considerably protruded out of the solid substance of the fungus.

Mr. Shuckard exhibited a hermaphrodite specimen of *Anthophora retusa*, recently captured by Mr. F. Smith at Barnes, one side of which exhibited the peculiar structure and colours of the male, and the other side those of the female.

Mr. Raddon exhibited, and distributed amongst the members present, living specimens of *Platyrhinus latirostris*, recently captured near Bristol in a compact species of fungus growing on an old ash-tree, in which were several small holes, out of which the insects emerged on the fungus being wetted, in order to lap up the moisture.

Some observations were made relative to the annoyance caused by the myriads of cockroaches, *Blatta Americana*, swarming in many parts of London, during which Col. Sykes strongly recommended the black-beetle trap with a glass rim, in which his servants nightly caught a very great number, and which was far more efficacious than red wafers, &c.

The following memoirs were read.

" Descriptions of a New Genus and some New Species of *Paussidæ* from the Collection of M. Gory," By J. O. Westwood, F. L. S.

" Extracts (relative to the *Annulosa*) from a Memoir upon the Nervous System of the Animal Kingdom in general, with reference to the Analogies exhibited by its Permanent State of Development in the various Tribes, with its Progressive Development in the Human Subject." By John Anderson, Esq., M. E.S. (Subsequently published by the Author as a distinct work.) The reading of this memoir was illustrated by the exhibition of an extensive

series of preparations of insects, and other invertebrated animals, showing the nervous system.

" Extract from a Letter from A. M'Barnet, Esq., of St. Vincent's, relative to the Ravages of the Mole-Cricket in that Island." Communicated by C. J. Johnstone, Esq. " The mole-cricket has, for some years, been destroying the pastures all over the Island, and has now, on many estates, attacked the young plants and the cane stools, and may probably account, in some measure, for the great falling off in the growth of the canes generally over the Island, although we were not aware of the cause. They are beginning to attract general attention, and probably that will lead to some method of destroying them. I have tried many experiments. Lamp oil destroys them very readily, but it is too expensive on a large scale. Soap-suds also kill them, but not so readily. This animal is known in England. Can you give me any information as to the best way of destroying them? I think the refuse of soap manufactories, or any greasy manure, might: soot, lime, and many other substances may be useful. They are under ground all day, and appear on the surface at night only."

" Notices relative to *Anobium tesselatum*, *Anommatus terricola*, *Bombyx mori*, and *Scolytus destructor*." By W. Spence, Esq., Hon. M. E. S., &c., as follows:—

" *Anobium tesselatum*.—My attention being attracted the other day, in passing through one of the streets of Brussels, by the extremely worm-eaten appearance of the ends of some large old oak beams, lying opposite to a house which had been entirely gutted in order to replace them by new ones, I stopped to observe them more closely, and found that what had struck me was evidently the work of the larvæ of some insect, which, on a narrower examination, I had no doubt had been those of *Anobium tesselatum*, as I detected several specimens of this species in its perfect state, remaining dead in the holes in which they had undergone their metamorphosis, and from some cause had not been able to escape. Several of the holes were visible in the upper angles and the beam where the joists had been inserted, but it was at its ends, and especially at one of them, that they chiefly abounded. Here for about a foot and a half of its length, and through nearly the whole of its thickness, which was fifteen to eighteen inches each way, the holes, which had about the diameter of a small quill, were so numerous and so close to each other, as exactly to resemble a honey-comb, the portion of wood that still divided them from each other being often scarcely at all thicker than the wax between two cells; and the whole end was thus in

such a state of decay, that if the beams had not been removed, the floors of the house must have soon fallen down. On inquiring of one of the workmen, he informed me that the necessity of replacing these beams, which, as the whole interior of the house required to be taken out, must have been a very costly operation, was entirely owing to the ravages of these insects, and that every year the same process, arising from the same cause, is called for in several of the old houses of the city. In fact, I had myself often before remarked this gutting of houses for the apparent sole end of changing the main beams, but had supposed that their decay was owing to dry rot or age, until ocular inspection, as above described, proved to me that the mischief is wholly caused by *Anobium tesselatum*, (for the beams, though probably above two hundred years old, were in all other parts as hard and sound as ever,) which thus annually puts the good citizens of Brussels to an expense of probably several thousand pounds, much of which might have possibly been always saved had the real cause of the evil been known, as the examination of the state of the beam ends in suspected cases would be easy, by removing a portion of the floors, when its existence would be at once seen by the large quantity of saw-dust-like excrement produced; and it perhaps would not have been difficult to put an effectual stop to it by wetting the part thoroughly with a solution of corrosive sublimate. It does not, however, appear that the possibility of arresting the mischief has ever occurred to the proprietors of houses, or the architects of Brussels, or that they have ever thought of directing the attention of the eminent naturalists around them to the subject, as, on mentioning it to several of these, I did not find them at all aware of the ravages committed by this little indefatigable and voracious borer.

"*Anommatus terricola*.—M. Wesmael in his description, read last October before the Royal Academy of Sciences of Brussels, of this new Coleopterous insect, of the family of the *Xylophagi*, remarkable for being entirely destitute of eyes, states that M. Robert, who discovered it near Liege, found it on the under-side of planks laid upon earth that had been slightly stirred; and since, when he placed the planks on the turf of a meadow none were taken, but when he had caused the turf to be previously pared off, several were soon caught, he conceived that its habits are subterraneous. I mention this fact, thinking it not unlikely that the use of similar traps might procure this insect in England. Its characters are, "*Testaceus, pilosulus, capite et thorace vage, elytris seriè punctatis. l. c.* $\frac{3}{4}$ *lin.*"

"*Silk-worms*.—At the meeting of the Royal Academy of Sciences

of Paris, April 18th, a letter was read, communicating the remarkable fact elicited by the investigations of the Chevalier Bassi of Milan, into the disease of silk-worms in the North of Italy, termed the *Muscardine*, that it is the result of the development of a *Cryptogamous* vegetable of the family of the *Mucedinées*, the *Botrytis Bassiana*, of which the germ being introduced into the body of the silk-worm causes it to perish, and appears subsequently on the surface in the form of a white efflorescence. The knowledge thus acquired of the cause and effects of this disease, which is not epidemic, as was formerly thought, but is contagious, being communicated by contact or inoculation to other silk-worms, as well as to caterpillars of various species, has led to a rational mode of treating it.

"*Scolytus destructor.*—Having lately observed that several of the fine elms in a particular quarter of the park at Brussels were nearly destroyed by the attacks of this pest, which has been so injurious in St. James's Park and other places near London, I pointed out the circumstance to M. George, Professor of Botany in the University, who agreed with me that unless measures were taken for the destruction of the larvæ with which the inner bark of the trees in question are filled, there would be great risk of the whole of this beautiful promenade falling eventually a sacrifice to the ravages of this insect. He represented the matter in a letter (subsequently published in the journals) to the burgomaster and municipal council, who appointed a commission for investigating the subject, at whose meeting I was present on Thursday last (April 21st), when a report was agreed to, advising the most likely means of remedying the evil, by peeling off and burning all the infected bark in trees partially attacked, and taking down those too far injured to have any chance of recovery. As there is nothing new or extraordinary in the attacks of this insect, I mention the preceding fact merely as an instance of the importance of Entomological knowledge, even in cases where at first sight it seems scarcely required. The men employed in the care of the park have been long aware of the decaying state of the trees referred to, and that even some of the young trees forming the Boulevard are similarly affected; but conceiving the disease to be occasioned by some defect in the roots or the soil, they seem to have regarded the evil as without remedy, and have never pursued those measures for checking it, which they would doubtless have long ago adopted, had they known that the secret enemy was an insect whose destructive powers were likely to augment in a geometrical ratio

every additional year in which it should be suffered to propagate unmolested."

For further observations by Mr. Spence on the *Scolytus destructor*, see Journal of Proceedings, June 6th, August 1st, and October, 1836; and April 3d, 1837.

The Rev. E. Stanley, (Bishop of Norwich,) who was present as a visiter, observed in reference to Mr. Spence's notices, that the discovery of M. Bassi appeared to afford a solution to the difficulties connected with the vegetating wasp of the West Indies, which he considered as analogous to the larvæ of the silkworm attacked by fungi, adding, that he had himself possessed a living caterpillar of the tussock-moth, near the head of which a fungus, one-fourth of an inch long, had protruded, and which subsequently caused the death of the caterpillar. The same gentleman also observed, with respect to the *Scolytus destructor*, that that insect appeared to him to have been improperly regarded as the primary cause of the injuries suffered by the elm-trees, believing that trees already diseased were alone subject to its attacks: mentioning a circumstance which had occurred near Chester, where some young and luxuriant trees had been attacked, but of which it was ascertained that the roots had penetrated into the blue clay, which had caused the gradual decay of the trees, and which consequently became more and more congenial to the *Scolytus*.

June 6th, 1836.

The Rev. W. Kirby, M.A. F.R.S., Hon. President, in the Chair.

Donations.

Journal of the Royal Geographical Society. Vol. 6, part 1. By that Society.

The Athenæum for May, 1836. By the Editor.

Fraser's Literary Chronicle, part 6. By the Editor.

A Proof Impression of a Portrait of the late A. H. Haworth, Esq., in a frame. Presented by Mr. Ingpen.

A Box of Insects from Frankfort. Presented by the Senator Van Heyden.

Eggs of a new Silkworm from China, for distribution amongst the Members. Presented by Dr. Boott.

Thomas Henry Hope, Esq., of Netley, Shropshire, was elected an Ordinary Member of the Society, and

M. Frælich, of Eilvagen, an ordinary Foreign Member.

Exhibitions, Memoirs, &c.

Mr. Waterhouse exhibited a specimen of *Nomada ferrugata*, which he had detected in the cell of a species of *Andrena*, (apparently not described by Mr. Kirby,) having previously observed the formation of the cell by the *Andrena* itself. Also three specimens of *Nomada Goodeniana*, dug out of banks where the nests of *Andrena nigro-ænea* were found. He also stated that he had found a specimen of *Halictus minutus*, infested by the larva of one of the *Strepsiptera*.

M. Desvignes exhibited specimens of *Hylecœtus dermestoides*, taken on the first of May, by himself, in Sherwood Forest, and found running very quickly upon the trunks of oak trees.

The following Memoirs were read,

"Description of a minute Parasite which infests the Larvæ of the *Stylopidæ* in very great numbers, and upon the insect produced from the eggs of *Meloe proscarabæus*." By J. O. Westwood.

"On the Physiological Peculiarities of several hermaphrodite *Lucanidæ*." By the same.

"Additional Notices relative to the Ravages and Natural History of *Scolytus destructor*." By W. Spence, Esq., in a Letter addressed to the Rev. F. W. Hope.

In this communication, dated from Brussels, May 30th 1836, Mr. Spence states that he had found a little parasite vermicle on the outer surface of the skin of many of the larvæ and of all the pupæ of *Scolytus destructor* which he had examined, and on some in vast numbers. It is very minute, perhaps about one-eighth of a line long, filiform, very slender and attenuated at each end; indeed, of the exact shape, as far as he could recollect, of the so-called Vinegar Eels, *Vibrio anguilla*, and moving in the same way, transparent, smooth, and with traces of transverse articulations, through M. Wesmael's microscope of one-fourth of a line focus, but without any appearance of mouth or intestine, the inside seeming merely filled with granular molecules. On first examining the pupa, they lie so closely apprysed to its surface as to be seen with great difficulty, but apparently from exposure to the air, many of them soon lift up their bodies, and move them rapidly about, seeming to remain attached to the pupa

by their heads only. Mr. Spence was in doubt whether the parasite belonged to the genus *Oxyuris* of Rudolphi's Class *Entozoa*, or to *Vibrio* of that of the *Infusoria* of Müller, to which he referred it on first discovering it, from its similarity to *Vibrio anguilla*, which he had formerly examined; but it does not agree with the characters of either, and still less with their habitats. Probably it might have been separated as a genus from these in the recent work of Ehrenberg on these microscopic animals. According to the *Dictionnaire d'Histoire Naturelle*, the species both of *Vibrio* and *Oxyuris* have a distinct mouth and intestinal canal, neither of which are to be seen in these animals, which, consequently, seem to form a distinct, though probably closely allied genus. He likewise requested information whether *Vibrio tritici*, figured by Mr. Bauer in the *Philosophical Transactions* for 1823, have a mouth and intestines or not.

Mr. Spence likewise stated that the mischief done at Brussels by the larvæ of *Scolytus destructor* turned out much more considerable than was at first supposed, it having been found necessary to cut down fifty or sixty trees on the Boulevards, besides full twenty (some of eighty years' growth, and with the wood perfectly sound) in the park, which, for the last three weeks preceding, (with the operations of the wood-cutters and sawyers, and fires to burn the bark,) had more resembled a German forest than a public garden, to the no small wonderment of the promenaders, who came in crowds to inquire about the " bêtes" denounced by the " Anglais" that had caused all this " topage." He had received a profusion of acknowledgments from all ranks of the Bruxellois for his exertions relative to this subject. It now appears, that years ago several trees were cut down, which there is no doubt were destroyed by the *Scolyti;* but their decay being attributed to age or the soil, a plentiful stock of partially-infected trees were left to diffuse the progeny of the occupants around them, as they have done very successfully, and the same would in all probability have been the case now; the two or three trees from which the bark was beginning to fall would have been condemned to the axe, whilst the much greater number, which, although swarming with larvæ, did not exteriorly show the least symptom of disease, would, as before, have been left a fertile nursery for largely propagating the malady. Mr. Spence further stated, that M. V. Andonia had been studying the habits of the *Scolyti* very closely, particularly *S. pygmæus*, which had committed dreadful devastation on whole forests of oak in France, and had made some new and important observations as to the way in which sound trees are brought into

that state of incipient disease in which alone they are selected by the female for depositing her eggs. He had likewise recently described two distinct urinary calculi, found in the so-called biliary vessels of *Lucanus capreolus*.

Mr. Spence also communicated the following notice of several memoirs of M. Wesmael. The first, "Sur la Circulation de Fluide nutritif dans les Pattes des *Corises*," (*C. Strigata*, Latr.,) confirming from his own observations Behn's discoveries, and explaining Dufour's denial of their accuracy, by the fact that he examined them in cold weather, in which M. Wesmael finds that the phenomenon is not visible. The second is a description of a new *Lepidopterous* genus, *Himantopterus*, with very long linear posterior wings. The species is from Java, and is specifically named *H. fuscinervis*. The third comprises a description of a new genus of the *Curculionidæ*, nearest to the *Apionidæ* of Schönherr's division *Orthoceræ*, but not described by that author, and which M. Wesmael names *Metorhynchus*, from its very long filiform rostrum, which is two and a half times as long as the body. The species is from the Cape of Good Hope, and is specifically named *M. brunneus*.* It is wholly rufescent, and the length of the body, including the rostrum, is from ten to twelve lines. The fourth is the description of a new genus of *Neuroptera*, belonging to the family *Planipennes*, and tribe *Hemerobiens*, which he names *Malacomiza*. The species is named *M. lactea;* it is one line long, and is found near Brussels.†

July 4th, 1836.

The Rev. F. W. Hope, F.R.S., President, in the Chair.

Donations.

Memoir on the Larva of Chalmys. Presented by Dr. Burmeister, the Author thereof.

* This insect evidently appears to be the *Antliarhinus Zamiæ Thunb.* Sch. (*Curc. haustellatus*, Fabr.) The entire omission of the group *Antliarhinides*, in Schönherr's first volume, probably induced M. Wesmael to consider it as an unknown genus. The group, however, is described in detail in the appendix to the third volume. (J. O. W.)

† This genus is evidently identical with that of which I read the description before the Entomological Society on the 7th July, 1834, under the name of *Coniortes*, and which Mr. Curtis subsequently published in his Illustrations of British Entomology, under the name of *Coniopteryx*. (J. O. W.)

No. 83 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

Rapporto sulla Memoria manoscritta del Sign. Castelnuovo, sulla Larve danneggiatrici del grano Siciliano (Zea Mays.) By M. Passerini, For. Hon. M. E. S., the Author thereof.

Fabricii Genera Insectorum. Presented by the Rev. F. W. Hope.

Insecta Liguriæ, 2 vols. 4to.;

Essai d'une Nouvelle Classification des Diplolepaires; and

Memoir upon the Trophi of Insects. All presented by M. Maximil. Spinola, For. M. E. S., the Author thereof.

The Magazine of Natural History for July, 1836. By the Editor.

A Letter upon the British Museum. Presented by Jno. Millard, the Author thereof.

The Athenæum for June, 1836. By the Editor.

A distorted Specimen of *Clytus arietis*; each elytron having a tubercular vesicle. Presented by Mr. Fennell.

Count Gotthelf Fischer de Waldheim, was elected an ordinary Foreign Member of the Society.

Exhibitions, Memoirs, &c.

Mr. W. W. Saunders exhibited impressions of a seal lately found amongst the ruins of the ancient city of Nicopolis, in Albania, bearing the figure of an insect resembling a *Lucanus*.

Mr. Hope exhibited a specimen of *Goliathus cacicus*, which he had lately obtained from the coast of Guinea.

Mr. Sells exhibited twenty-five specimens of a small *Lepidopterous* larva, found by him in a cell formed by a small *Odynerus* at Kingston, in wood. Mr. Saunders stated that he had found as many as seventy-five small larvæ in the cell of *Epipone spinipes*, and Mr. Waterhouse observed, that he had discovered three *Lepidopterous* larvæ in the cell of an *Odynerus*, together with larvæ of one of the *Chrysomelidæ*.

Mr. Westwood exhibited an extensive collection of insects (the artificial representatives of which are employed by fly-fishers in angling for trout) made by Mr. Ronalds for the illustration of his work entitled "The Fly-Fisher's Entomology."

Mr. Hope made some observations upon the mode adopted in the United States for obtaining two crops of silk in the course of the season, as described in Mr. Kenrick's work lately published in

America on that subject. Mr. Sells stated that the eggs of the new silkworm, distributed at the last meeting, had hatched, and that he had many caterpillars which thrived well upon mulberry leaves.

The following memoir was read,

"Description of a New Genus of Exotic Bees." By J. O. Westwood.

August 1*st*, 1836.

W. W. Saunders, Esq., F.L.S., Vice-President, in the Chair.

Donations.

Faldermann, Insecta Mongoliæ et Chinæ. Presented by J. C. London, Esq.

The Magazine of Natural History, No. 64. By the Editor.

Some remarks on the Study of Zoology and on the Present State of the Science. By the Rev. L. Jenyns, M.A., F.L.S., &c. Presented by the Author.

Descriptions of the Articulated Animals collected in the North West Expedition of Captain Back. By J. G. Children, Esq. Presented by the Author.

Annales de la Société Entomologique de France, 1836, part 2. By that Society.

Nos. 13 and 14 of a Manual of Entomology. By W. E. Shuckard, Esq.

No. 6 of Guérin's Bulletin de Zoologie. Purchased by the Society.

William George Barnes, Esq., of Great Russell Street, Covent Garden, and F. Cochran, Esq. were elected Ordinary Members of the Society.

Exhibitions, Memoirs, &c.

Mr. J. O. Westwood exhibited some stems of asparagus much eaten by the larvæ of *Crioceris asparagi*, which has committed considerable damage in some of the market-gardens round London this season, where it has been very abundant.

Messrs. Stephens and Shuckard stated that the Asparagus-Beetle seemed to be affected by local circumstances, as they had never found it at Battersea Fields, which abound with market-

gardens. Mr. Saunders stated that he had taken it at Wandsworth.

He also exhibited three species of Lamellicorn Beetles from the Collection of Sir Patrick Walker, belonging to the family *Scarabæidæ*, but constituting new genera, having all the characters of *Scarabæi*, but furnished with two spurs to the intermediate tibiæ.

He also read an extract from a letter addressed to him by W. Spence, Esq., in which it is stated that the vermicles observed upon the pupæ of *Scolytus destructor*, described in a former letter, belonged to the genus *Vibrio*, as now restricted by Ehrenberg, and that the elm-trees in the promenades of Dunkirk, Calais, and Boulogne, were in a worse state, owing to the attacks of the *Scolytus*, than in the park at Brussels, although no one was aware of the cause, but attributed the destruction of the trees to the cold sea winds. The writer had attended a meeting of the directors of the museum and of the public authorities at Boulogne, and pointed out to them the measures which ought to be taken, if they desired to preserve the rest of their trees, fifty of the finest and some scores of the young ones being dead, or fast dying, for want of a little entomological knowledge and timely care. From specimens of infected elms lately seen, he was inclined to think that the female *Scolyti* are six weeks or two months in eating out their galleries and laying their eggs.

Mr. Westwood also called the attention of the Society to the great injury caused by the same insect to the elms in Kensington Gardens, a great number of which on the south side were completely killed. The mischief was moreover rapidly spreading round London, and he was convinced that unless some strenuous steps were taken, the elms in our public parks, &c. would be completely destroyed. He was of opinion that the injury was entirely attributable to the *Scolytus*, and not to the soil, atmosphere, &c.

Mr. Scales stated to the meeting that he had failed in his attempts to exclude the common house-fly from apartments by means of string nets; the window of the apartment where the experiment was tried was towards the north-west, with a single window, and the meshes of the net were not so large as those of a cabbage-net; there was no looking-glass opposite the window, and yet the flies lighted upon the strings, and crept through.

Mr. Ashton noticed the connexion of the wings in *Membracis cornuta* during flight, the anterior hooking upon the posterior, thus affording an instance of another order besides the *Lepidoptera* and *Hymenoptera*, in which the wings were connected together.

A Memoir containing Descriptions of some New Species of Exotic Insects, by J. O. Westwood, was read.

September 5th, 1836.

J. F. Stephens, Esq. in the Chair.

Donations.

No. 84 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

Descriptions of Two New American Species of *Hydrachna*. By Messrs. Dana and Whelpley, the Authors thereof.

The Athenæum for July and August, 1836. By the Editor.

G. Jarman, Esq. of 21, Upper Berkely Street, and J. Bagster, Esq. of Paternoster Row, were elected Ordinary Members of the Society.

Memoirs, Exhibitions, &c.

Mr. Anderson exhibited specimens of *Trichius nobilis*, whereof nearly fifty were found in the perfect state, and some in the act of copulation, amongst some vegetable mould in a codling-apple tree in the garden of Dr. Dowler, of Richmond, by whom specimens were presented to the Society.

Mr. Ashton exhibited two remarkable varieties of *Argynnis Paphia* found in Kent by Mr. C. Griesbach, the ground colour of the wings on the upper side being very dark greenish brown with the ordinary black spots. Mr. Stephens stated that there was a similar variety in the Collection of the British Museum.

Mr. Shuckard exhibited a specimen of *Philanthus androgynus* recently captured in Epping Forest.

Mr. Westwood noticed the great injury caused in the market-gardens to the west of London at the present time by a species of *Aphis* covered with a purple powder, which infests and prevents the growth of the cabbage, cauliflowers, &c. It had not been before observed by the gardeners who had directed his attention to it, nor by the Covent Garden salesmen, by whom it was termed a new kind of blight. He had suggested the application of lime and of tobacco water, and Mr. Sells considered that both of these materials united would be still more efficacious.

Mr. Scales also noticed the great prevalence during the present season of various species of caterpillars (*Pontia brassicæ*, *Mamestra brassicæ*, and *Persicariæ*, &c.) upon cabbages, and which was attributed by Mr. Westwood to the peculiar nature of the weather during the present season, and by whom it was suggested that considerable advantage might result from an inquiry into the connexion between the atmospheric changes upon vegetation and the abundance or scarcity of insects, especially of the herbivorous kinds, during the period of observation.

Mr. Ashton exhibited a specimen of *Œshna viatica*, in which the eyes after death had partially shrunk, leaving regularly-formed areas of considerable size separated by elevated ridges. Mr. Stephens regarded this peculiarity as the result of the immaturity of the individual.

Mr. Stephens exhibited an iron case, being an old snuff canister, in which he had confined a male and female *Lucanus cervus*, which had gnawed a hole through the side, an inch in diameter, the action of the jaws being clearly visible.

The following memoirs were read,—

"Some Account of the Habits of various species of East Indian *Coleoptera*." Contained in a Letter addressed by W. H. Benson, Esq. to the Rev. W. Kirby.

"Notice of the Entomological Proceedings at the Meeting of the British Association held at Bristol." Communicated by the Rev. F. W. Hope.

In the Natural History Section, the following Entomological communications were made :—

Mr. Rootsey exhibited a living specimen of a large spider, which he considered to be the *Mygale avicularia*, taken at Bristol in a ship from the Bay of Campeachy. He noticed some of the extraordinary stories commonly reported of the venomous nature of this animal,* and its bird-catching propensities, but which he had thus obtained an opportunity of refuting. Mr. Lister mentioned a similar capture, and added that his specimen readily devoured beetles. Mr. Hope considered the insect to be specifically distinct from the *M. avicularia*, and that it was a species recently described by Perty in the *Delect. Anim. Art. Brasiliæ*.

Mr. Rootsey, in some observations on the mangel-wurzel, stated that the opinion of its not being liable to the attacks of insects, was erroneous, as he had found *Haltica nemorum* feeding upon it.

* It is to *Lycosa tarantula*, and not *Mygale avicularia*, that this vulgar notion is attributed. (J. O. W.)

In a discussion upon the germinating power of seeds, Mr. Hope stated a practice common in some parts of Spain, of baking corn to a certain extent, by exposing it to a temperature of 150°, or upwards, for the purpose of destroying an insect by which it is liable to be attacked.

Mr. Curtis exhibited some terminal shoots of a *Pinus* attacked by *Hylurgus piniperda*, and made some observations on the habits of that insect.

Mr. Hope exhibited the hermaphrodite specimen of *Lucanus camelus*, Fabr. (exhibited at the meeting of this Society on the 2nd May preceding by Mr. Raddon,) which led to a discussion, in which Mr. Curtis, Dr. Riley, and Mr. Yarrell took part, concerning those principles of developement by which monstrosities of the above description are reducible to the operation of general laws. Mr. Yarrell particularly noticed the occurrence of both male and female organs on opposite sides of various hermaphrodites, in lobsters and birds, which he had dissected, and stated that he had met with a fish which had a hard roe on one side and a soft one on the other. He had met with a very extraordinary example of double sex in a fowl which he had not yet made public, but of which he now gave some details.

Mr. Hope read a communication expressive of the probability that some of the early notions of antiquity were derived from the observations of insects. In attempting to account for the apparently spontaneous generation of those insects which rise in myriads from the mud left by the waters of the Nile, the philosophers of antiquity turned their earliest attention to the operation of the external influence of the elements; and Mr. Hope, supporting his opinion by numerous quotations, showed that they considered the sun as the chief and efficacious power in producing this effect. The origin of the doctrine of Metempsychosis he considered might be deduced from their actual observation of the metamorphoses of certain insects.

Mr. Hope exhibited a large collection of North American insects obtained from raw turpentine by Mr. Raddon.

Mr. Yates exhibited specimens of the vegetating wasp of Jamaica, an insect infested by a fungus allied to a *Sphæria*, which attached itself to its body, even as was asserted, during life. Mr. Hope considered the wasp as belonging to the genus *Polistes*, and stated that several *Curculionidæ* were liable to be similarly infested.

Mr. Sells, referring to Mr. Benson's papers, noticed the common occurrence of the *Gymnopleuri* in Jamaica, where he had observed

their similar habits. He likewise stated, on the authority of a friend who had observed the *Sisyphi* in the south of Europe, that these last-named insects make use of the spine with which each of the hind legs is armed, in trundling along their balls of dung, by fixing the spine on each side of the ball, which thus rolls along on its own axis like a garden-roller.

3rd October, 1836.

J. F. Stephens, Esq. in the Chair.

Donations.

No. 3 of the Journal of the Natural History Society of Boston. Presented by that Society.

Anniversary Address delivered before the Medico-Botanical Society of London. Presented by that Society.

Journal of the Bahama Society for the Diffusion of Knowledge. Presented by that Society.

Memoir upon Various Exotic *Crustacea*. By F. E. Guérin, For. M. E. S., the Author thereof.

Various Species of British *Noctuidæ*. By W. Raddon, Esq.

M. W. Westermann, of Copenhagen, was elected a Foreign Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

J. C. Johnstone, Esq. exhibited living specimens of the nut grass of the West Indies, a plant very destructive in the sugar-cane plantations, choking the young plants, and which had been grown in the apartments of the Society in a garden-pot in which some sugar-canes had been growing. The nut grass was found to be infested with a species of *Aphis*.

He also exhibited specimens of the *Gryllotalpa didactyla*, Latr. from Saint Vincent's, the ravages of which had been described at the meeting of the 2nd May preceding.

Mr. Westwood exhibited a collection of insects captured in Corfu and Albania, by R. Templeton, Esq.

Likewise a congregation of the cocoons of *Ilythyia colonella*, found in the interior of the stump of an acacia, described by him

in the present month's number of the Magazine of Natural History.

Mr. Children exhibited specimens of the leaves of a pear-tree infested by a subcortical larva, which forms large blotches upon the leaves of the size of a sixpence, accompanied by a letter which had been forwarded to him by H. R. H. the duke of Sussex, from the forester of Lord Dinorben, giving an account of the injury caused by its attacks upon standard trees, and suggesting the use of gas-tar to be applied upon the walls in the neighbourhood of the trees upon which the larva undergoes its change to the chrysalis.*

Mr. Westwood read a letter addressed to himself from W. Spence, Esq., comprising additional details upon the *Scolytus destructor*. After alluding to Mr. Westwood's observations made to the Society on the 1st August last, and to the step subsequently taken by the Commissioners of Woods and Forests, of consigning to the axe four hundred of the finest trees in Kensington Gardens, which had been pronounced unclean, the writer proceeds, "the test of 'uncleanness' is by no means so simple as they (the Commissioners) perhaps suppose, the fact being that it often happens, as I have seen in instances without number, that an old elm may be pierced with innumerable holes, and *seem* filled with larvæ, when there is not in reality a single one in it, the holes being made solely by the *males* for food, (according to M. Audouin's important observation on this head,) and all that is necessary, in order effectually to save the tree, being to shave off the outer rough bark, and to give it two or three coats of gas-tar, to keep off the females in future." After alluding to the destruction of the elms in the promenades of all the large towns in the north of France, Montreuil, Dieppe, Rouen, Havre de Grace, Caen, St. Lo, Granville, &c., &c., Mr. Spence proceeds: "one preliminary fact is of great importance, viz. that the prevalent idea even among Entomologists, that the female *Scolyti* attack only those elms which are beginning to perish from *natural* decay, is entirely *erroneous*. It is quite true that the female *Scolyti* never lay their eggs, except in trees in a languishing and declining state, but hundreds of observations have proved to me the truth of M. Audouin's observation,

* This insect is evidently the larva of *Tinea Clerckella*, Linn., the habits of which have been partially detailed by Mr. Knight in the second volume of the new series of the Horticultural Society's Transactions, and by whom the washing of the trees once a week with a weak infusion of tobacco in water at the end of May and during the month of June, at the period of the insect in the winged state, had a very beneficial effect in driving the moths away. (J. O. W.)

that it is the peculiar office of the males to bring into this incipient stage of decay *young* and *perfectly healthy* trees, and consequently that the allowing a few old trees to swarm with the larvæ for some years unmolested, is sufficient to lay the foundation of the ruin even of trees recently planted, with every apparent condition of insuring their vigorous growth, as I have seen instances everywhere in one tour by hundreds.

"So thoroughly do the elms in the French promenades swarm with *Scolyti*, that I have been able to study their habits almost as well while travelling on our leisurely plan of remaining a week or ten days at a place, as if I had been stationary on the borders of a forest of those trees, and I have thus (as well as in timber-yards, and even in the streets where the operations of sowing and splitting fire-wood for winter use is going on everywhere) picked up many facts in their economy quite new to me, though probably seen and recorded by former observers. Among the rest I found at Bayeux about a fortnight ago, pupæ just ready for disclosure, swarming with the same *Vibrio* on their surface which I observed at Brussels, thus proving that the presence of this parasite is not accidental. At Rouen, in their public garden, I got specimens of another species of *Scolytus*, which has destroyed many of their mountain ashes. And I also ascertained, during the fortnight we remained there, the transformation of a larva which covered the *leaves* of their elms by myriads, rendering the trees as brown as if blasted by lightning, and which turned out to be a *Galeruca*, allied to *G. calmariensis*."

There were also read,—

"A Letter containing some Observations on the Ravages of the Larva of *Athalia centifoliæ* upon Turnips, with Various Suggestions for preventing the same." By W. Sells, Esq. M.E.S.

"Description of a New Genus of Coleopterous Insects from Corfu." By J. O. Westwood, F.L.S.

Mr. Yarrell stated that the *Athalia centifoliæ* formed the subject of a paper by himself in the forthcoming part of the Transactions of the Zoological Society, and that he had ascertained that ducks might be readily brought to feed and fatten upon the larvæ. It was also suggested by Mr. Stephens that the perfect insects might readily be captured by means of the Norfolk sweeping-net described by Messrs. Kirby and Spence.

Mr. Ingpen, in allusion to the *Aphides* upon the nut-grass grown in the Society's apartments, stated that he had repeatedly found specimens of *Aphides* during the winter at the roots of grass in the fields.

7th November, 1836.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Récherches sur les Insectes nuisibles à la Vigne. Presented by the Baron Walckenaer, the Author thereof.

The Athenæum for September and October. By the Editor.

Gould, Natural History of Ants;

Fourcroy, Entomologia Parisiensis, 2 vols. sm. 12mo.;

Forster, Enchiridion Historiæ Naturalis;

De Geer, Genera et Species Insectorum. Auct. Retzius;

Olivier, Histoire Naturelle des Insectes Coléoptères. Vol. I.;

All presented by the Rev. F. W. Hope.

Monstrositates Coleopterorum. Auctore Dr. Asmuss. Presented by the Author.

Nos. 16 and 17 of the Entomological Magazine. By the Editors.

J. W. G. Gutch, Esq. of Wind Street, Glamorganshire, and William Sharpe Mac Leay, Esq., were elected Ordinary Members of the Society; the suspension of the certificate in favour of the latter having, by the resolution of the meeting, been dispensed with.

Exhibitions, Memoirs, &c.

A letter was read from Robert H. Schomburgh, Esq. of George Town, Demerara, addressed to the Secretary, stating that he had despatched a collection of insects made by himself in the interior of British Guiana for the Society.

The president exhibited specimens of *Myrmica unafasciata?* found at Long's Hotel, Bond Street, and communicated to him by Mr. Holme. It was stated by the former, that they were regarded as an East Indian species, but such was certainly not the fact. He considered it very probable that in many cases it was communicated in fire-wood or faggots.

He also exhibited a remarkable monstrosity in *Geotrupes stercorarius*, in which both the anterior tibiæ were very short, compressed, destitute of spines and curved, and the tarsi wanting.

He also exhibited specimens of the larva of the pale tussock moth, *Laria fascelina*, known in Kent under the name of Hop-dogs and Hop-cats, from the great injury which they commit in hop-grounds. He also alluded to the ravages of the wire-worm, or larvæ of some species of *Elateridæ*, and to the means for checking

its ravages, discovered by Mr. Day, by laying slices of potatoe upon the surface of the ground in the neighbourhood of places frequented by them, and by examining them every morning, when considerable numbers of the worms were to be found upon them. It had been noticed, that burying the potatoe a short distance under-ground, was not nearly so advantageous.

He also exhibited, by permission of the Naval and Military Museum, two very large nests of an unknown species of *Polistes* from the river Plata.

Mr. Westwood exhibited the collection of *Chalcididæ* and other minute *Hymenoptera*, now belonging to the museum of Bonn, but formerly to Dr. Nees von Esenbeck, by whom they had been described in the *Hymenopterorum Monographiæ*, and by whose desire they had been forwarded to Mr. Westwood for examination.

He also exhibited specimens of *Æpus fulvescens*, and of one of the *Staphylinidæ*, together with some Coleopterous larvæ and pupæ, apparently of the last-named species, and a small species of *Podura*, forwarded to him by Dr. Johnston, by whom they had been captured on the sea-coast at Berwick-upon-Tweed at a considerable distance below high water-mark. (The Staphylinideous insect, together with its supposed larva and pupa, has been subsequently described by Mr. Westwood in the Magazine of Zoology and Botany, under the name of *Micralymma Johnstonæ*.)

Mr. Bowerbank exhibited a specimen of the beautiful *Castnia coronis*, found flying on the outside of one of the hothouses of Messrs. Loddiges, of Hackney, and supposed to have been imported in the pupa state from South America, of which it is a native.

The following memoirs were read :—

" On the Habits of the House Ant, *Myrmica unafasciata?*" By Dr. Bostock, F.R.S.

" Notes respecting the Variety of the Silk-worm which produces White Silk." By W. Sells, Esq.

" On the *Evaniidæ* and some allied Genera of *Hymenoptera*." By J. O. Westwood.

" Observations upon the Larva of the *Haltica nemorum* and other Turnip-feeding Insects." By Henry Le Keux, Esq. Communicated by W. Raddon, Esq.

In the discussion which ensued upon Dr. Bostock's paper, Mr. Waterhouse stated that he had found it in the neighbourhood of Billingsgate. Mr. Desvignes noticed a plan adopted in China in similar cases, where ridges of salt are laid round the nest of the

ants, which they dare not pass over. The secretary suggested that it would be very desirable to ascertain at what period of the year this ant swarmed, as it would be then easy to destroy the females, which quitted their nests in considerable numbers, and which would have the effect of preventing the establishment of fresh colonies. He had adopted this plan with the garden-ant, and had found it successful. Mr. Shuckard stated, however, that he had found this species in the winged state in moss in the middle of winter.

Some discussion also took place on the means by which moths make their escape out of the cocoon by the assistance of the secretion with which one end is found to be discoloured. Mr. Waterhouse stated that the silk was thereby dissolved, and it was questioned whether this secretion proceeded from the mouth or the anus, being by some regarded as the analogue of the red fluid discharged by some butterflies, and which Mr. Shuckard considered as analogous to the *meconium* of infants. As, however, it was from the end of the cocoon, where the head first appears, it is more probably discharged from the mouth; the president, indeed, stating that the fluid discharged from the anus is differently coloured.

5th December, 1836.

The Rev. F. W. Hope, President, in the Chair.

Donations.

Transactions of the Zoological Society of London, vol. i. part 2; and vol. ii. part 1. Presented by that Society.

Journal of the Royal Geographical Society, vol. vi. part 2. By that Society.

Annales de la Société Entomologique de France, for 1836, part iii. By that Society.

Nouveaux Mémoires de la Société Impériale des Naturalistes de Moscou, tom. iv.; and

Bulletin de la Soc. imp. Nat. de Moscou, tom. ix. Both presented by that Society.

The Magazine of Natural History, for November and December. By the Editor.

The Athenæum for November. By the Editor.

A Collection of Insects from the Interior of British Guiana. By R. H. Schomburgh, Esq.

M. Theodore Lacordaire, Professor of Natural History at Liege, was elected an Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

Mr. Yarrell exhibited specimens of *Agrotis segetis*, which had been forwarded to him from Saffron Walden, where they have been very destructive to the turnips; five or six attacking the roots of that and other kinds of plants. Mr. Scales also exhibited larvæ of apparently the same insect, which had been equally destructive in his garden at Stoke Newington, the caterpillars coming abroad at night, and eating round the roots and vegetables just at the surface of the ground.

The president exhibited a collection of the native *Trilobites*, upon which he made some remarks, announcing his intention of undertaking a memoir upon that tribe of extinct animals, and requesting the communication of specimens from the members.

Mr. Westwood, on behalf of Mr. Sells, exhibited specimens of *Chartergus nidulans*, and its parasite *Chalcis pyramidea*, Fab. several dead specimens of which latter Mr. Sells had obtained from a nest of the *Chartergus*. The secretary also exhibited a nest of this insect, and made some observations on the manner in which it was increased in size from time to time, as the community increased in extent, fresh layers of cells being added at the under-side of the lower part of the nest, as was evident from a transverse section of the nest, and from each of the superior layers having a single circular orifice in the centre, as is also the case with the ordinary bottom of the nest. He also presented a figure, and read some notes upon the specific characters of *Chalcis pyramidea*.

He also exhibited an original letter from the younger Linnæus to Mr. Drury, giving an account, among other matters, of the habits of the *Œstrus hominis*, of South America. (This letter has been since published by Mr. Westwood, in the preface to the new edition of Drury's Illustrations of Exotic Entomology.)

He also made some observations upon the (apparently new) species of *Aphis*, found upon the plants of the West Indian nut grass, grown in the apartments of the Society, and which it was stated by Mr. J. C. Johnson, was an apparently unknown species of *Cyperus*, and which is very destructive in the West Indies, overrunning the cultivated grounds, so that it has been found necessary to offer rewards for the greatest number of the sifted roots.

The following memoirs were read:—

"Notice of the Coleopterous Insects of the Scilly Islands." By Frederick Holme, Esq., M. A.

"Monograph on the Hymenopterous Genus *Scleroderma*." By J. O. Westwood.

"Observations upon the Natural History of the Purple Emperor Butterfly *(Apatura Iris.)*" By Dr. Pallas,—originally communicated to the Aurelian Society of London.

"Notice relative to the Mole Cricket of the West Indies." In a letter from Mr. M'Barnet, of the Island of Grenada; communicated by J. C. Johnstone, Esq., of which the following is a copy:—

"The insect has *always* (I believe) been known in the West Indies, but not to any extent in St. Vincent's, until after the dreadful hurricane in that island in 1831, when it rapidly increased in numbers; first appearing in the pastures about the town of Kingston, and then extending all along the sea-coast, and gradually getting into the interior of the island. The creature is seldom seen above ground in the day-time, but flies about at night, and is attracted by the light into the negroes' houses. Its effects are first shown on the pastures, by the appearance of decayed *patches* often all over the field; it burrows under the surface of the earth, destroying the roots of the grass, and causing the sward on the surface to die, leaving the ground as clear of vegetation as if it had been newly ploughed and harrowed; and some considerable time of course elapses before it recovers itself. The mode in which it attacks the cane is, by destroying the young shoots at, or immediately under, the surface of the earth; and also by boring into the *plants*, (which, as you are probably aware, are cut from the top and softest part of the full-grown cane,) and lodging there until it eats the soft part between the joints, and effectually destroys it. On digging the ground where they have been for some time, their eggs are found in great numbers; in the first instance having the shape and appearance of a small pearl; from that state it swells a little, gets a fleshy appearance, and forms the young cricket, which bears an exact resemblance to the full grown one in miniature.

"The mole cricket having increased to such an extent *since* the hurricane, it has been supposed that some destroying animal, or counteracting cause, was removed by that destructive visitation. I have used both lime and soap-lees (oil being too expensive) to destroy them; but with what real success I have yet to learn. I should mention they show themselves in the *richest* part of the fields first."

"Descriptions of some New Exotic Insects." By G. R. Waterhouse, Esq.

In the discussion which ensued, Mr. Hope observed, in allusion to the communications of Messrs. Yarrell and Scales, that it appeared to him not improbable, that the great increase in the number of obnoxious insects observed during the last two or three years, might possibly be attributed to the mildness of the winters, whence the *Halticæ*, *Athaliæ*, and other turnip-destroying insects had received no check. He had also observed the turnips in the neighbourhood of Shrewsbury to be destroyed by the larvæ of *Agrotis*, many of which were found at each root.

Mr. Waterhouse observed, that the insects which he had described in the memoir just read, were species which possessed the appearance of groups, to which they did not in fact belong; thus the *Dasytes* had the appearance of *Ctenostoma*, *Belus* of *Lixus*, *Leptosomus* of *Brentus*, and *Thoracantha* of *Mordella*. He had, at a former meeting, exhibited a collection of insects of some extent, from the museum of the president, showing many such representative relations; and he considered that each group contained types of all other groups of equal rank with itself; thus the *order Colcoptera* contained representatives of all the other *orders*. He also thought it would be highly interesting to examine the comparative structure of these analogous groups in detail, as it was not improbable that by so doing, we might obtain a clue to the knowledge of the uses of many peculiarities of structure existing in both such groups, of which we are at present completely ignorant; as for example, the bifid claws in the floral *Lamellicorns*, and in certain bees, as noticed in his Monograph upon *Diphucephala*, or the incrassated hind-legs of the *Donaciæ* and *Chalcides*, both of which groups reside upon subaquatic plants, and neither of which are saltatorial. In making these remarks, however, he wished it to be understood, that he was not an advocate either of the quinarian or circular distribution; and he cited the group of *Carabidæ*, which appeared to him to have been unnaturally forced into an circular series by the union of *Blethisa* and *Elaphrus* with *Carabus*, and which he considered unnatural.

Mr. Hope also objected to the circular distribution of groups, and contended that this theory was borrowed from the ancients.

Mr. Westwood, in acknowledging the relations of analogy pointed out by Mr. Waterhouse, detailed the uses which had been proposed to be made by Messrs. M'Leay, Swainson, &c. of such relations, for the purpose of ascertaining the correctness of and verifying distributions founded primarily upon direct affinities; but he con-

tended that it was very necessary from the facility with which analogies of various kinds might be discovered, (see *Horæ Entomologicæ*, pp. 392, 393, and 438,) and the imposing appearance of verisimilitude which they imparted to an arrangement, to proceed with the greatest caution in the adoption and employment of such relations of analogy, instancing as an example, which exhibited, as it appeared to him, a want of such caution, the employment by Mr. Swainson of the character of the suspension of the chrysalis as affording proofs of the typicality and sub-typicality of the *Papilionidæ* and *Nymphalidæ*,*—whereas, had it suited with Mr. Swainson's views to consider the latter as typical, and the former as subtypical, the rapid flight of Camilla, or the height of flight of the purple emperor, (towering towards heaven,) might have been adduced as proofs of the typicality of the *Nymphalidæ*.

2nd January, 1837.

The Rev. F. W. Hope, President, in the Chair.

Donations.

The Athenæum for December, 1836. By the Editor.

No. 18 of the Entomological Magazine. By the Editor.

An Essay on the Fossorial Hymenoptera of Great Britain. By W. E. Shuckard, Esq., the Author thereof.

Signor Cristofori, of Milan, was elected an Ordinary Foreign Member of the Society.

Exhibitions, Memoirs, &c.

Mr. Raddon exhibited specimens of insects in raw turpentine and

* "The chrysalis of the true butterflies (*Papilionides*, Sw.) is fixed with its head upwards, as if it looked to the pure regions of heaven for the enjoyment it is to receive in its last and final state of perfection; but the chrysalis of the brush-footed butterflies (*Nymphalides*, Sw.) whose caterpillars are stinging, is suspended with the head downwards to the earth, thus pointing to the world as the only habitation where its innumerable [analogous] types of evil are permitted to reside, or to that dark and bottomless region where punishment awaits the wicked at their last great change."—Swainson on the Geography and Classification of Animals, Part iii. div. 4: On the Primary Types of Nature; the first of which is considered as typical of perfection; and the second as sub-typical, often sanguinary, and as the types of evil.

others in spirits, and described the plan which he had adopted for disengaging them from the turpentine by the use of strong spirit of ammonia.

He also exhibited specimens of various small insects in a fine state of preservation, which he had obtained from a gum which he considered to be Copal, by means of the oil of spike or lavender, but which from its high price cannot be generally adopted as a solvent. He also explained the difference between Copal and Animè, the latter being distinguished by a wavy slit when broken.

Mr. Hope doubted whether the gum in question was Copal, which he had never found to contain insects; he considered it rather to be Animè, and suggested the employment of the essence of caoutchouc as a solvent; he also entered into various details relative to the distinction between Copal and Animè.

Mr. Raddon also exhibited specimens of African insects in fine preservation, which had been sent to this country in spirits, and which he consequently recommended as an excellent method of transmitting insects from abroad.

The same member also exhibited two specimens of moths found dead upon a furze bush, and apparently covered with a fungus which had grown upon and now enveloped them.

Mr. Westwood exhibited a collection of types of all M. Westmael's genera of *Braconidæ*, which he had received from that author.

The following memoirs were read :—

" Notes upon the Trap-door-making Spider of Jamaica (*Cteniza nidulans*)." By W. Sells, Esq.

" Description of the Species of *Haltica* collected by Mr. C. Darwin, in New South Wales." By G. R. Waterhouse, Esq.

" On Caprification, with Descriptions of the Insects employed in the Levant for that Purpose." By J. O. Westwood.

Mr. Mac Leay, in allusion to Mr. Sell's paper, stated that he had found *Cteniza nidulans* in Cuba, and in reply to some observations of the president relative to other large species of spiders of tropical countries, he observed that he had found more than half-a-dozen in Cuba, which had been confounded under the name of *Avicularia*.

Mr. Westwood, in allusion to Mr. Waterhouse's Memoir, stated that the species of *Haltica* were stated by Mr. Cunningham, in his work upon New South Wales, to be equally injurious with the same insects in our own country.

Anniversary Meeting, 23rd January, 1837.

The Rev. F. W. Hope, President, in the Chair.

In pursuance of the By-laws, the four following gentlemen were removed from the Council:

Col. Sykes.	C. Curtis, Esq.
Dr. Horsfield.	C. Pickering, Esq.

and the four following gentlemen were elected into the Council in their stead:

J. G. Children, Esq.	G. R. Waterhouse, Esq.
W. S. Mac Leay, Esq.	Mr. W. Bennett.

And the following gentlemen were elected as Officers for the ensuing year:

President	J. F. Stephens, Esq.
Treasurer	W. Yarrell, Esq.
Secretary	J. O. Westwood.
Curators	Messrs. Shuckard and Westwood.

Mr. Waterhouse, on behalf of the auditors of the treasurer's accounts, read a report and abstract thereof, which was unanimously adopted.

The Rev. F. W. Hope then read an address upon the state of the Society, its progress and prospects.

It was resolved that a vote of thanks should be given to the Rev. F. W. Hope for his address, and that he should be requested to allow the same to be printed.*

The Secretary gave notice that the Council had resolved, that the subject of the prize essays for the ensuing year should be the *Athalia centifoliæ*, or black caterpillar of the turnips.

February 5th, 1837.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Memoires de la Société de Physique de Genève, Vols. 1, 2, 5, 6, & 7, part 2. By that Society.

* This address has since been published for distribution amongst the members. Copies of it may be had at the Society's rooms, including an abstract of the treasurer's accounts as audited.

Transactions of the Berwickshire Naturalists' Club. By that Club.

Additamenta Entomologica ad Faunam Rossicam. Auctore Franc. Faldermann; and

Bereicherung zur Kaferkunde des Russisches Reiches. By the same. Both presented by M. Faldermann.

Sketch of the Comparative Anatomy of the Nervous System. By J. Anderson, Esq., M. E. S. Presented by the Author.

Description of *Dolichoscelis Haworthii*. By the Rev. F. W. Hope, the Author thereof.

Magazine of Natural History, New Series, Nos. 1 & 2. By the Editor.

The Athenæum for January, 1837. By the Editor.

Description of the Genus *Embia*. By J. O. Westwood.

On the Modern Nomenclature of Natural History. By the same.

Some Account of a Congregation of Moths found in the Interior of an Acacia Tree. By the same.

Some Account of the *Chigoe*, translated from Pohl and Kollar's Work on the Obnoxious Insects of Brazil. By W. E. Shuckard, Esq.

Description of a New Species of *Eurynome*. By Mr. Hailstone. All presented by J. O. Westwood.

No. 85 of Illustrations of British Entomology. By J. F. Stephens, Esq., the Author thereof.

J. Turner, Esq., of Manchester, whose Certificate had been duly suspended, was elected an Ordinary Member of the Society.

The President nominated the four following gentlemen to act as Vice-Presidents during the ensuing year; namely,

The Rev. F. W. Hope.	W. E. Shuckard, Esq.
W. W. Saunders, Esq.	Samuel Hanson, Esq.

Exhibitions, Memoirs, &c.

A Letter was read from Mr. John Bohn, of Henrietta Street, Covent Garden, accompanied by a Copy of the *Historia tripartita*, printed in 1472, and which had been rendered completely valueless in the course of a year, by the attacks of the book-worm (*Anobium striatum*), specimens of the larvæ and perfect states of which were still to be seen alive in the worm-holes, and requesting information as to any probable remedy; whereupon Mr. G. R. Waterhouse stated his opinion that a few drops of prussic acid dropped upon the leaves of a book, infested by these insects, at occasional distances apart, would have the effect of destroying the insects, espe-

cially if the book were placed in an air-tight box, as he had found this acid extremely serviceable in destroying fleas and other obnoxious insects.

Mr. J. C. Johnston stated, that in the West Indies he had been in the habit of washing the backs of his books with a fluid composed of ten grains of corrosive sublimate and four ounces of alcohol, and which had completely prevented the attacks of insects. Mr. Stephens suggested that baking the books infested, in tin boxes, or by placing them in a close tin box, and immersing this in boiling water, would have the effect of killing the insects ; this latter being the more preferable plan, and which had been adopted by Entomologists whose collections were infested with *Dermestes*, &c.

Mr. Sells stated, that in the West Indies, the book-binders, at his suggestion, had employed corrosive sublimate in making the paste used in book-binding, which had a very good effect. He also stated that, at St. Thomas' Hospital he had been informed that it was the practice to apply heat to sheets and other garments to destroy lice, &c., and inquired the degree of heat which would be sufficient for this purpose. Mr. Stephens mentioned that 170° would be sufficient to destroy the book-worms, and would not have the effect of injuring the books.

Mr. Hope stated, that M. Temminck, the celebrated ornithologist, previous to his departure from Europe, had his books dipped in a solution of quassia, which had preserved them from the attacks of insects in tropical climates ; and also stated that a solution of colocynth would probably be found equally serviceable.

The following memoirs were read :—

" Catalogue of Coleopterous Insects found near Penzance and in other parts of the Land's End District." By Frederick Holme, Esq., M. A.

" Inquiries into the ground for the opinion that Ants lay up Stores of Food for the Winter." By the Rev. F. W. Hope.

In reference to the last-mentioned paper, Mr. J. O. Westwood contended that the facts stated by Col. Sykes in his Memoir upon *Atta providens*, did not warrant the assertion that ants laid up stores, as it was evident that the grain still remained unconsumed many months after it was first collected, and he considered that in this and other cases, where grain appeared to have been collected for food, it was rather for the purposes of the architecture of the nest, as, indeed, Huber had suggested in the case of the great wood-ant. Moreover, dried grain did not constitute the food of ants, which were more partial to fluids, raw flesh, ripe fruits, &c. ;

neither was he disposed to regard the statements of Virgil as those obtained by accurate observation.

Mr. Hope, however, maintained the opposite opinion, and considered the statements of Virgil and the old naturalists and poets ought to be taken in a strictly literal sense.

Mr. J. C. Johnstone stated that in the West Indies he had observed the ants dragging along the dead bodies of cock-roaches, and that he had also found grains of Indian corn in their nests. He also noticed the communicative powers of these insects, a single individual giving information of any food deposited in the neighbourhood of the nest, to a very great number of the inhabitants of a nest, which immediately sallied forth to seize it.

JOURNAL OF PROCEEDINGS.

March 6th, 1837.

The Rev. F. W. Hope, F.R.S., Vice-President, in the Chair.

Donations.

Transactions of the Linnæan Society of London. Vol. XII. Presented by that Society.

No. 3 of the New Series of the Magazine of Natural History. By the Editor.

The Athenæum, for February. By the Editor.

J. Mayne, Esq. F.R.S., and
The Rev. J. Image, M. A.,
were elected Ordinary Members of the Society.

Memoirs, Exhibitions, &c.

"On an early Remedy adopted for the Prevention and Destruction of Vermin." Communicated by L. H. Petit, Esq. F.R.S., M.E.S., &c.

The following is a copy of the old Receipt alluded to by Mr. Petit to destroy Vermin:

"Whitewash the walls with whitewash, made or mixed with lime, mixing with about a bucket of the whitewash a decoction of Staves-acre* [*i. e.* the Root of the Larkspur]. A quarter of a pound thereof to be boiled in water for that purpose.

* With respect to this name, though somewhat barbarized, it has descended to us from the Greek,—being the Σταφις ἀγρια of Dioscorides, Book iv., c. 156, edit. of 1598;—the Αστραφις of Galen, vol. xiii. Paris edit. of 1679;—the Astaphis agria sive staphis of Pliny, Nat. Hist. Book xxiii. c. 13, Hardwin's edit.;—styled Estaphisagrie ou Herbe aux Poulx, in old French;—and Staves-acre or Lousewort,

" Mem.—Where rooms are papered, the floors may be washed with the Staves-acre decoction mixed with chloride of lime.

" And the effects of the decoction alone may be tried upon such articles of furniture as would be injured by the application of chloride of lime."

This decoction is sometimes used as a lotion for pigs, but whether for the mange or measles, or what other disease, Mr. Petit did not know.

" Additional Note relative to the Trap-door Spider of Jamaica," accompanied by Figures. By W. Sells, Esq. M.E.S.

" Observations in Support of the Opinion, that the Blatta or Cockroach cannot be considered identical with ' Oreb.' " By the Rev. F. W. Hope.

Mr. Petit made some verbal remarks on the necessity of consulting the ancient authorities for many practical points relative to the destruction or prevention of the attacks of various obnoxious species of insects, which had been suffered in too many cases to fall into disuse.

Mr. Sells, in allusion to the memoir of Mr. Hope, observed, that in the West Indies the Cockroach attacks the living bodies of men, eating off the cuticle from the fingers and toes (which Mr. J. C. Johnstone likewise confirmed); and also made some observations relative to the attacks of flies in Egypt, especially that described by Sonini under the name of the burning fly, which was exceedingly painful, especially when it came in contact with the naked skin.

April 3d, 1837.

The Rev. F. W. Hope, Vice-President, in the Chair.

Donations.

Bibliographie Entomologique. 2 Vols. 8vo. By M. Perchéron, the Author thereof.

An Ornithological Letter to Mr. Swainson. By C. Waterton, Esq., the Author thereof.

in English. It is the Delphinium Staphisagria of botanists ; and from it is obtained the Delphinia, or Delphiore, of chemists, mentioned in Brande's Chemistry, 2d edit. vol. iii. p. 74. It is figured in Gerard's Herbal, Johnson's edit. 1633, p. 495 ; and in P. A. Matthiole's Works, edit. 1674, p. 850 ; and I believe also in Woodville's Medical Botany.

On the Insects which attack the Elms. By W. Spence, Esq. Hon. M.E.S. (from the *Arboretum Britannicum.*)

The Magazine of Natural History. No. 4. New Series. By the Editor.

The Athenæum, for March. By the Editor.

A Memoir upon the *Œstridæ*. By Bracy Clark, Esq. Presented by the Rev. F. W. Hope.

Specimens of the male and female of *Chiasognathus Grantii*, from the island of Chiloe. By Charles Darwin, Esq.

Specimens of the common House-fly of the United States; of *Tomicus chalcographus*, and of a species of *Ceratopogon* reared from the exudation from elm-trees. By W. Spence, Esq.

Mr. Hope exhibited, on behalf of Lord Prudhoe, specimens of the female and workers of a species of *Termes*, with a piece of red iron stone in which these insects appeared to have commenced the construction of their nest; also a very large species of *Mygale* in spirits.

C. Darwin, Esq. exhibited a fine series of specimens of five species of the genus *Carabus*, from the southern extremity of South America.

Mr. Westwood exhibited a series of drawings, chiefly of new species of North American Hymenopterous insects, obtained from the raw turpentine by Mr. Raddon.

He also called the attention of the meeting to the ravages of insects (apparently *Anobia*) upon the pictures in the National Gallery, and read an extract from the parliamentary Report upon this subject;* and suggested that it might be serviceable to satu-

* The parliamentary Report relative to the state of the pictures in the National Gallery contains the following evidence:

Mr. Seagur states that the Sebastian del Piombo has been occasionally eaten round the edge by a little worm, which is confined to a particular spot merely at the edge. He thinks the worms of very little importance.

Mr. Jno. Peel states that the Sebastian del Piombo is in the worst state of any in the collection, that it is going to decay, as fast as it possibly can, owing to the worms which have got into it, both the *meal* worm and the *wood* worm. He thinks the worms are now eating very fast, and in fact they are destroying the picture piecemeal. They are encroaching 6 to 18 inches from the edges towards the centre.

When asked whether relining would remove the insects, &c.? Yes, it would completely.

Mr. E. Solly confirms Mr. Peel's statements with respect to the worms to be found in the Sebastian del Piombo, and states that he had in his possession last year two of the small beetle kind: they were given to him by a foreign professor, who took them off the picture himself.

rate the back of the pannels, or wooden frame-work of the pictures, (which especially harboured and attracted the insects,) with a solution of corrosive sublimate or some other matter, or with Kyan's patent solution, which would destroy the insects. Care, however, should be taken not to employ any materials which would affect the picture itself.

Mr. Sells objected to the employment of any metallic salts, as liable to injure the colours, and recommended a strong infusion of colocynth and quassia, together with spirit of turpentine and spirit of camphor, which he considered would form a harmless remedy.

Mr. Hope recommended the immediate removal of the wooden guards of the pictures, and suggested the application of a solution of resin animé upon the back of the pictures.

Mr. Waterhouse considered it advisable to have the guards formed of cedar instead of oak, which latter was very liable to the attacks of the *Anobia*, and recommended that the backs of the pictures should, if possible, be subjected to the action of the fumes of prussic acid, by the employment of a false temporary back, which he had found sufficiently powerful to kill many hundred caterpillars, even where a single drop only had been used.

Dr. Blundell proposed washing the backs of the pictures with the expressed juice of green walnuts, as a very powerful bitter, as well as with pyraligenous ether.

Mr. Bell considered that, as the subject was one of considerable importance, it would be desirable that a committee should be formed for examining the state of the pictures, and experimenting upon articles of wood attacked by *Anobia*.

Mr. Westwood also called the attention of the Society to an advertisement which had appeared in the newspapers of the preceding day, announcing the sale of a powder, a solution of which would have the effect of rendering turnip-seed completely free from the attacks of the turnip-fly, which statement, in consequence of the discovery of the larvæ and eggs of the *Haltica nemorum*, was evidently incorrect, and calculated only to deceive purchasers.

He also exhibited specimens of the larvæ of a Lepidopterous insect of considerable size, found in great numbers in a wheat-stack near Bristol, and communicated by Mr. Raddon; as well as several small dipterous insects belonging to the family *Muscidæ*, found in the same situation.

Mr. Ingpen communicated a letter received by him from Mr. Smith, containing an account of the natural history of one of the *Cynipidæ*, which inhabits the small flat galls on the under-side of

oak-leaves, (called oak-spangles,) and which had been regarded by some authors as cryptogamous parasites upon the leaves, no insects having been observed in the interior of them.

"Mr. Smith states that in the beginning of March, in a mossy hollow at the top of Coombe Wood, were large drifts of oak-leaves. He observed that most of the leaves had these excrescences on their under-sides, but they were dried up and withered as well as the leaves. He broke many of them, but to no purpose; they appeared nothing but remains of withered fungus. He next removed large masses of leaves, and found that those more towards the bottom of the heap, although withered themselves, had the fungus upon them quite fresh, as when on the trees in summer. He cut open one of these, and to his astonishment a small black insect, with four wings and rather red legs, crawled out. He then opened a great many of these apparently fresh ones, and out of each extracted a fly. This led him to further observation;—when he found that those leaves, which from their depth under the mass had been kept moist, produced the perfect insect,—those which were lower down, and soaking wet, contained the insect in an earlier stage, and some which he found in a watercourse had merely a small grub, so nearly resembling the pulp of the gall, (as he supposed he might call it,) that it required some attention to distinguish it. The galls on the leaves on the surface of the heaps, as he before observed, were dried up. He also examined some of the leaves which still remained on the trees, but although they were covered with galls, they had withered, and consequently the insect had perished. So that it appeared that the insect must remain in the egg state until late in the autumn, and that its development is the result of the accident of the leaf being so situated during the winter months, that it shall acquire a sufficient degree of moisture to keep the gall in a fresh or growing state, to serve as nutriment for the insect, which he should imagine is nourished by its juices. He found two or three flies among the leaves already developed, but from the various stages in which he found the insect in the galls, he concluded that the majority would be some weeks before they would make their appearance.

"The leaves which had the galls on them containing the fly could hardly be moved without their falling off. Those in an earlier stage were attached more firmly, and the withered galls adhered rather strongly."*

* Nees von Esenbeck (Hym. Monogr. ii. 266) and Reaumur were unable to form any notion as to the production of these "galles en champignon," as these

The Secretary read some extracts from a letter recently received by him, by Mr. R. H. Lewis from Van Diemen's Land, containing various observations upon the natural history and entomology of that island.

In respect to the species of *Perga*, whose habits he had previously observed (see Vol. i. p. 232 ; P. Lewisii. *Westw.*), he states that he did not succeed in rearing the larvæ which he had found, nor was he yet acquainted with the male insect, but he had that year had an opportunity of confirming his previous observations. There is but one brood in the year, and it is somewhat singular that the earliest portion of their lives is passed during the winter season [in Van Diemen's Land], when they are subject to heavy rains. When resting in the day the larvæ, like most other *Terebrantia*, carry their heads erect. On their mouths is a drop of a yellow gummy fluid, and if touched, they throw their heads back, and vomit this in some quantity. It is very thick, and seems to be given them as a protection against *Ichneumonidæ*, one of which tribe preys upon them ; and he had seen it (the *Ichneumon*) dead, with the wings and legs covered and glued together by the gummy matter. He thus proceeds :—

" The general features of the Entomology of Van Diemen's Land, though perhaps in some respect more attractive in appearance than the British, is certainly inferior to the corresponding latitude in the northern hemisphere. Many groups even are less attractive than the British ; the *Papiliones*, for instance. You must not therefore expect me to ascertain the history of all the splendid productions you receive in England from New South Wales.

" I have of course been up Mount Wellington, and spread my entomological nets 4,000 feet above the level of the sea. I caught some moths, a *Feronia* of some sort, a very curious Anobium-like looking insect, with the elytra spiny. I also caught a pretty *Eumolpus*, some *Tipulæ*, *Muscæ*, &c.

" The *Platypus* [Ornithorynchus] I had was a young one, it fed kindly on small crabs and sea crustacea ; when disturbed it emits

oak-spangles are called by the latter. The former author indeed notices that they are parasitically attacked by an *Eurytoma*, and the latter states that he had found *between* their under-surface and the leaf specimens of a minute larva. I have repeatedly found these larvæ (which appear to be dipterous) in the month of September, and have figured them in the *Arboretum Britannicum*, p. 1827, where I have given a long detail of the history of these galls. Olivier, in the *Encyclopédie Méthodique*, was acquainted with their history, and described the true inhabitant under the name of *Diplolepis lenticulatus*, which Fabricius altered to *Cynips longipennis*.—[J. O. W.]

a peculiar gurgling sound, is very active, and cleans itself with its beak, or rostrum, or nose, or bill, or whatever it is, and also with its hind legs.

"I have detected four species of *Fossores*, with apterous females in copulâ; and have also another species I am almost certain of."

Extracts were also read from a letter, dated 26th March, 1837, addressed to the Secretary, by William Spence, Esq. F.R.S., Hon. M.E.S., containing further observations upon the economy of *Scolytus destructor*, accompanied by separate copies for distribution amongst the members, of an article upon the Diseases to which the Elm is subject. Mr. Spence thus proceeds:—

"My objects in sending these papers to the Society are, to put the members in possession of the details of the mode adopted at Brussels for the treatment of elms suspected of being attacked by *Scolyti*, and also to direct the attention of such of them as may have an opportunity of making observations on the subject, to a point in M. Audouin's important discovery, which seems to me to want a fuller elucidation than it has yet received, and which I will proceed briefly to explain.

"When M. Audouin mentioned to me last spring, during the short and hurried interview I had with him, the outline of his discovery, I understood him to say that it is the *male Scolyti* only, that by eating the bark of sound trees bring on in them that state of partial decay which afterwards fits them for being selected by the females for the deposition of their eggs. In a long and interesting letter, however, with which he favoured me in reply to one I addressed to him asking for his consent to his discovery being announced in Mr. Loudon's work, he informs me that I mistook his meaning on this head, and that he considers the females equally with the males to attack sound trees for food: and as his authority, resting on the long and close attention he has paid to the subject, is of such great weight, I have in the *Arboretum Britannicum*, p. 5, stated the fact to be so. I confess, however, I have considerable doubts on this point, and am strongly inclined to believe that my original impression, that the males alone attack sound trees, is well founded, as it does not seem to me likely that when the females in forming their egg-galleries are gnawing with their mandibles a substance which must be so similar in its taste to that on which the males feed, they should refrain from swallowing at least so much of what they detach as will satisfy their hunger; and that they should quit their operations there for the sake of

coming to the surface in order to form other galleries in the exterior bark of other trees simply for food : and this supposition seems considerably confirmed by three facts which have come under my observation.

"1. In the first place, I have repeatedly seen the males (which are readily known by their two oval cartilaginous bristles and intermediate fringe of hairs) running along the surface of trees in which the females were forming their egg-galleries, and inserting their heads into them, upon which the females receded from the upper end of their galleries, and advanced, out of the opening, their anus, to which, after touching it repeatedly with its antennæ, the male turned its anus, both sexes exhibiting that agitation which precedes copulation. Now though I was never so fortunate as to see an actual union under these circumstances, yet as I have several times seen these preliminary advances, I have little doubt that the union of the sexes does take place at the opening of the gallery which the female is making, which seems a probable occurrence if the female be supposed to feed on the bark she excavates, and thus constantly to remain in her gallery; whereas if she be supposed to leave the gallery daily in order to feed on the sound trees which the males also attack, it would seem much more likely that the sexual intercourse should take place upon *them*, and, as they would daily meet there, there would seem no need of the males resorting in search of the females to other trees where they are employed in their egg-galleries.

"2. Another fact, rendering it probable that the female does not quit her gallery in search of other food, is the following. Having for a trifling gratuity induced some men who were splitting elm for fire-wood in the streets of Boulogne in July last, to detach the bark from several logs, I was able to obtain specimens in which were galleries quite distinct and detached from each other, and in various degrees of forwardness, *with the female in each*. These specimens I took to our hotel, and wrapped up all together loosely in a newspaper ; and on examining them at different times afterwards, during a week or longer, I always found the females (still alive), each at the end of its gallery, which it had evidently never quitted, as if instinctively attached to the spot,—a circumstance very natural, if we suppose that these galleries are the constant abodes of the females, and where they find their food, but not easily explicable if we suppose that they feed along with the males on other trees ; as in this case my females when hungry would

have quitted their galleries, and made their way out of, or through the paper, in search of their habitual repast.

"3. In the third place, I have repeatedly found, as other observers (including M. Audouin in his letter to me) have stated they have done, the females lying dead at the further end of their galleries long after the larvæ were hatched, proving that, after depositing her eggs, the female had died there,—a result very probable, if we suppose that she there found her food, but very unlikely to occur if hunger required her daily exit to feed on another tree; as in that case, after completing her gallery and laying her last egg, why should she return to it? and it would seem a very far-fetched supposition to assume that her vitality was so exactly apportioned to her store of eggs, that on laying the last she instantly expired, without having strength to emerge from her gallery in search of her food.

"Combining these facts with another which I have ascertained as far as the rough dissection on a tour, and the assistance of a pocket lens only, would allow, namely, that but one or two full-grown eggs are developed and excluded daily, and that consequently one of the longest galleries, containing often twenty to thirty eggs on each side, or forty to sixty in all, must occupy the female several weeks in its construction and the deposition of her eggs, I have been led to the following conclusions as to the way in which a female proceeds:—I conceive that soon after her exclusion from the pupa, and emerging from the tree in which as a larva she has fed, a first union with the male takes place, and that she then commences boring into the bark to form her egg-gallery, which *she never wholly quits,* however long she may be occupied in making it, but eats and digests what she excavates, merely retiring backwards from time to time (which she does as readily and quickly as she advances forward) to the entrance-hole, in order to void her excrement and receive the additional embraces of the male, in case, as seems to me likely from what I have observed, more than one copulation is required to impregnate the whole number of eggs, and that ultimately she in general dies at the end of her beloved gallery, in which her instinct has concentrated all her enjoyments —those of eating, the sexual intercourse, and the deposition of her eggs: and that thus, being fully and more agreeably occupied, she does not, as M. Audouin supposes she does, assist the male in eating the bark of sound trees.

"I need scarcely add that I attach no value whatever to this hypothesis, being well aware what small dependance can ever be

placed on insulated and hastily-observed facts like the above, and that it is highly probable that M. Audouin's opposite theory, being built upon a far more accurate and close observation, is the true one; but as unfortunately the letter with which he favoured me, though adverting at considerable length to other points, does not enter into any details as to this, I have thought it best in this hasty scrawl (of course not at all meant for publication) to state my present impressions, as the clearest way of directing the attention of the members of the Society, who may have inclination and opportunities (probably more favourable than mine) to pursue the investigation, to the precise points which seem to require examination, and may most directly lead to ascertaining the true state of the case.

"In concluding this subject it may not be superfluous to add, that I have reason to believe that successive broods of *Scolyti* are disclosed in the perfect state from May to August, and that the females may be found engaged in the operations of forming their galleries during the whole of this period. I also beg to express my hope that such of the members as have the opportunity, will endeavour to ascertain whether, in the case of other wood-boring genera, as *Hylesinus*, *Tomicus*, &c. the same preliminary attacks for food only are made on sound ash and fir-trees, &c. so as to prepare them for being attacked by the females, as take place in elms.

"I enclose in a small box three species of insects for the Society's cabinet.

"1st. Specimens of the most common kind of house-fly at Newhaven, Connecticut, U.S. Sent me by Mr. Herrick.

"2d. A minute dipterous species [of the genus *Ceratopogon*] with its pupa case, which I have bred from the larva which feeds on the sap flowing into the ulcers in elms, (see the extract from the *Arboretum Britannicum*, p. 1, line 5 from top), in which I always found them abundant in France, and probably they are equally so in England. If, as is most likely, this insect be described, I shall be glad to learn its name; and if undescribed, I hope some member of the Society who studies *Diptera* will describe it.

"3d. One of the *Bostrichidæ*, Fab., Gyll. 3. 358. nec Oliv., 6-*dentatus*, Oliv., which I take to be *Tomicus chalcographus*. This has doubtless been found in England,

as if not native, it must have long since been introduced from the north in the fir-trees so constantly imported. The specimens sent I obtained along with several others, only two days ago, from bark of a foreign fir-tree which I chanced to pass as it was being prepared for a mast, in *a living state*, several being just emerging from the pupæ, and others still larvæ. I enclose a portion of the bark to show the kind of galleries the female makes, which it will be seen are horizontal, like those of the genus *Hylesinus*, (not vertical, as those made by the *Scolyti*,) though very often more or less oblique and curved.

"On Insects and their Larvæ inhabiting the Human Body, accompanied by various Tables." By the Rev. F. W. Hope, F.R.S., &c.

In the discussion which took place upon the last-mentioned Memoir, the author observed that he considered the presence of these various species of insects, recorded to have been found in the human body, was accidental; and that he did not consider any internal species to infest man alone.

Dr. Blundell mentioned a case of which he had been witness in Flanders, in which a girl, about nine or ten years old, had been greatly afflicted with fits, supposed to have been epileptic, and which had been treated by various Flemish physicians without effect. He had, however, tried vermifuge medicines, turpentine, and male fern, and in two or three days an enormous quantity of larvæ, apparently of *Musca domestica*, was voided, and which were supposed to have been in the colon.

Professor T. Bell admitted that it was with much caution that reports of this kind, of cases introduced into the surgical reports, ought to be received, in consequence of the constant impositions endeavoured to be practised upon medical men by ignorant patients; and he mentioned a case which had occurred at Norwich, in which some supposed worms (*Entozoa*) had proved, on examination, to be only the genital organs of snails, of which the patient had been in the habit of eating, but had been unable to digest the hard parts in question. He also mentioned a case of obstinate inflammation of the antrum of the jaw, from which very great quantities of blood worms, or larvæ of *Chironomus plumosus*, had been discharged.

Professor Owen, in allusion to the powers of resisting the heat

of the human stomach, possessed by some of the lower invertebrated animals, noticed the existence of certain gasteropodous animals in the thermal springs of Italy. And also stated an instance in which a *Filaria*, which had taken up its abode in the head of a cod-fish, had survived the boiling of the latter, and had been seen crawling about the dish in which it was placed. On the other hand, he mentioned that *Filariæ* in dead herrings, which had been frozen for a considerable period, had also retained their vitality.

Mr. Shuckard, on the authority of Mr. Standish, mentioned a circumstance, of which he had been informed, of a living moth having made its escape out of a potatoe which had been boiled; but this fact was not worthy of credit.

Mr. Bracy Clark considered the accounts hitherto published of the occurrence of *Œstri* in the human body, as doubtful. Of these he stated that the chief were those of Pallas, and a case recorded in the twenty-third volume of the Surgical Transactions. He entered into a detail of the habits of the three sections of the *Œstridæ*, and contended that the cases of *Œstrus*, hitherto recorded, attacking man, must have been produced by *Œ. bovis*, and not by species of the divisions in which the larvæ resided in the stomachs or the frontal sinuses of animals. He also remarked upon the improbability of there being a species of *Œstrus* confined to man, who was ordinarily clothed, thereby preventing the attacks of the insect.

Mr. Hope contended that, although the cases of Œstrideous attacks upon man might be confined to the species belonging to the group of which *Œ. bovis* was the type, it was not likely that the cases which had occurred in South America and the West Indies were produced by that species, which was an inhabitant of our own country.

May 1*st*, 1837.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Philosophical Transactions of the Royal Society for 1836. Parts 1 and 2.

Proceedings of the Royal Society for 1836.

List of Fellows of the Royal Society for 1836.

Anniversary Address of H. R. H. the President for 1837.

All presented by the Royal Society.

Inauguracion de las Ensenansas gratuitas of the Royal Society of Barcelona. Presented by M. Graells, For. M.E.S.

Histoire naturelle des Insectes aptères. First volume, with three fascicles of plates. By M. le Baron Walckenaer, the Author thereof.

Description of *Argulus Catostomi*. By Messrs. Dana and Whelpley, the Authors thereof.

Annales de la Société Entomologique de France. 1836. Part 4. By that Society.

The Athenæum, for April 1837. By the Editor.

Magazine of Natural History. No. 5, New Series. By the Editor.

Monographia Serpentium Hungariæ. By M. Fridvaldsky, the Author thereof.

Specimens of the Queen of the White Ants and some other Insects, with the commencement of the Nest of the former Species. By Lord Prudhoe.

George Bellas Greenhough, Esq., V.P.G.S., &c., &c.

Aylmer Bourke Lambert, Esq., V.P.L.S., &c., &c., and

W. Harrison, Esq.

were elected Ordinary Members of the Society.

Exhibitions, Memoirs, &c.

The Rev. F. W. Hope and Mr. Waterhouse exhibited a small collection of exotic *Coleoptera* from the collection of Sir Patrick Walker, comprising various new species belonging to the genera *Carabus*, *Tetraopes*, *Oiceoptoma*, *Adelium*, *Alurnus*, and a new genus, apparently connecting *Distichocera* and *Lamia*, from New Holland.

Dr. Bostock, F.R.S., who was present as a visitor, exhibited specimens of a minute species of ant, which had been found very troublesome in the houses in Liverpool, and which was identical with the ant observed in the interior of houses in London. He also stated that he had found the application of lime very serviceable in expelling them from their retreats.

Mr. Shuckard stated that these ants were not the *Myrmica unifasciata*, as had been supposed, but a species new to science. [Since described by Mr. Shuckard in the Magazine of Nat. History, N. S., Nov. 1838, under the name of *M. domestica*.]

The Secretary read a short notice of a course of lectures now being delivered at the Jardin des Plantes, by M. Victor Audouin, upon the insects obnoxious to plants and animals.

Mr. Ashton exhibited a collection of New Holland insects, containing several specimens of *Chelepteryx Collesi*, Gray, described in the second part of the Transactions of the Society.

The following Memoirs were read:—

"Observations upon some Peculiarities observed in the Size of the Hexagonal Lenses of the Eyes of various Insects." By Robert John Ashton, Esq., M.E.S.

"Observations upon the Economy of the *Chigoe*, or Jigger of the West Indies." By W. Sells, Esq., M.E.S.

"Observations on the Structural Peculiarities of the *Chigoe*." By J. O. Westwood, Sec. E. S., &c.

"Remarks on the Symbolical Ideas entertained of the *Scarabæus* by the Ancient Egyptians." By the Rev. F. W. Hope, F.R.S., &c.

"Descriptions of new Species of *Carabus* and *Calosoma*, collected by Charles Darwin, Esq." By the Rev. F. W. Hope. [See p. 128.]

"On a Disease to which Chickens are subject, produced by the Presence of an Annelidous Worm in the Throat." By J. Main, A.L.S.

In the discussion which ensued, Mr. Shuckard stated, that he had for some time past been occupied in a series of researches similar to those of Mr. Ashton, upon the comparative size of the hexagonal lenses of the eyes of insects, and the variation to which they are subject in the same individual; that he had especially noticed that the males of the *Tabanidæ* had some of the facets greatly enlarged, although the same was not observed in *Astata*, nor the males of the hive bee, also in *Gyrninus;* he did not, however, adopt the views of Mr. Ashton. He likewise stated that Marcel de Serres had already observed the existence of this diversity of size.

Mr. Yarrell stated that the disease in chickens described by Mr. Main was caused by a small annelidous parasite, described

by Col. Montague in the Supplement to the Ornithological Dictionary, and that it also occurred in the pheasant.

Mr. Waterhouse stated, in respect to the characters of the species of *Carabus* brought from Patagonia by Mr. Darwin, that the anterior tarsi of the males are not dilated, as in the European species, and that in the *Calosomæ* some possessed four, and some only three of the joints dilated.

Mr. Westwood stated, in reference to the observations of Mr. Hope upon the sacred beetle, that the idea of its emblematically representing the resurrection, originated in its sudden reappearance after the subsiding of the waters of the Nile. This had been repeatedly stated by various writers upon the subject, and especially by Latreille, in his Memoir upon the Sacred Beetles of the Egyptians.

Mr. Petit admitted such was, at least, one of the causes which had led to the sacred character of these insects; and he also stated that another reason was, that it was considered as emblematical of the zodaical signs; the five tarsal joints in all the legs (thirty in number) represented the thirty days in a month. He also entered into various details in connexion with this subject.

June 5th, 1837.

The Rev. W. Kirby, M.A., F.R.S., Hon. President, in the Chair.

Donations.

Mémoires de la Société royale des Sciences de l'Agriculture et des Arts de Lille. 13 vols. dated 1811, 1819, 1823, 1826 (2 vols.), 1828, 1829, 1831, 1832, 1833 (2 vols.), 1834 and 1835. Presented by that Society.

Annales de la Société Entomologique de France 1837. Part 1. By that Society.

Description of *Meloe collegialis*.

Memoir upon the Habits of *Artemia salina*.

Observations upon a case of Calculus found in the Body of *Lucanus Cervus*. All presented by M. V. Audouin, the Author thereof.

Account of the Progress of Entomology for 1835.

Memoir upon the Natural History of the genus *Calandra*. Both by Dr. H. Burmeister, the Author thereof.

No. 6 of the Magazine of Nat. Hist. New Series. By the Editor.

The Athenæum, for May. By the Editor.

The Right Hon. the Earl of Burlington, and

Charles Denham Orlando Jephson, Esq., M.P., F.G.S., &c. were elected Ordinary Members of the Society.

Memoirs, Exhibitions, &c.

Mr. Westwood called the attention of the members present to a circumstance which he had noticed relative to the appearance of insects at the usual time this spring, although vegetation had been retarded for several weeks. He had been in the habit of capturing *Lyda inanita* in his garden at Hammersmith for several seasons past, during the last week in May, and the insect had appeared this season at the same time. The *Andrenæ* had also appeared at the usual time, being now nearly all past. It was suggested by Mr. Bennett, that although this might be the case, yet it was to be observed, that these insects had not hitherto appeared in any thing like their usual numbers.

The following Memoirs were read:—

"Notice of a Case in which the Larvæ of a Dipterous Insect, supposed to be *Anthomyia canicularis* (Meig.), were expelled in Large Quantities from the Human Intestines, accompanied by a Description of the same." By the Rev. L. Jenyns, M.A., F.L.S., &c.

"Descriptions of several new Species of Exotic Coleopterous Insects." By J. O. Westwood, F.L.S., &c.

"Observations upon the Natural History of two Species of Lepidopterous Insects of Van Diemen's Land," in a Letter addressed to the Secretary. By Thomas J. Ewing, Esq., For. M.E.S. Mr. Ewing's communication is as follows:

"I have also traced a processionary caterpillar to its crysalis state, but the ichneumons are here so plentiful that they intrude everywhere, and have destroyed my hopes until next year, when I trust once again to meet with them. They lived with me above two months; and in their order of marching far outdo the *Cnethocampa processionea*, as they invariably march in circles, or

rather ovals, and, when young, will follow one another round and round for hours together. They retain their propensities even when full grown, and even if there be only two, one immediately takes the lead, and the other follows. When I had as many as fifty, I used sometimes to separate them into three or four parties, when the same result of election took place, and the marching was continued in as many separate circles. I found the eggs on the under-side of a leaf of the stringy bark tree (*Eucalyptus*?), covered with a most beautiful protection of black down, not in tufts, but exactly like black velvet; but I will spare you further description until I am more successful.

"The habits of another species* struck me as being rather singular. I have called it in my notes the "Migrating Caterpillar." Back brownish olive, bounded by a longitudinal straw-coloured stripe on each side. Sides rather lighter, with minute dots: on the back are small jet-black dots, two on each segment only perceptible when the animal walks. Under-parts straw-coloured yellow. Legs and prolegs brown. Head glossy brown, with a Y-shaped yellow band, with its base towards the back, which part of the head has also two short yellow stripes.

"This caterpillar made its appearance about 20th December, on which day a barley-field was ploughed up, not far from the house, which appeared literally to be moving, and for five days after the migration of the caterpillars was astonishing. They proceeded up the road from the field, entered at the gateway into the lawn, then crossed the verandah in front of the house, and through two gardens, until they reached a field layed down in English grasses, where they committed sad havoc. Many of them did not stop here, as the whole road, from the field to the

* The moth produced from these migrating caterpillars is one of the *Noctuidæ*, apparently belonging to the genus *Xylophasia*, being about the size of *Noctua hepatica*. I have represented it in pl. xx. fig. 1. It may be described thus.

Noctua (*Xylophasia?*) *Ewingii*, Westw. Pallidè grisea; lineis tenuissimis longitudinalibus ad basin alarum anticarum serieque denticulorum obliquâ versus apicem, brunneis; strigâ tenui punctoque ordinario albis, hujus medio nigro, ciliâ albo-maculatâ, maculis mediis in discum alarum in lineis tenuissimis albis extensis; alis posticis pallidè fuscis, apicibus saturatioribus.

Long. corp. lin. 9. Expans. alar. lin. 19.

Habitat in Terrâ Van Diemenii. Dom. Ewing. Larva migratoria.

Mr. Davis has described the proceedings of a singular procession of caterpillars, noticed at Adelaide, in South Australia, probably identical with those observed by Mr. Ewing, in the Magazine of Natural History, New Series, for March, 1839. —(J. O. W.)

town, about half a mile, was black with them. They did not cease migrating for more than a fortnight, although in much diminished numbers, but for the first days the verandah appeared to be alive, notwithstanding the servant was ordered to sweep it three or four times each day. Nothing stopped them, as they climbed the walls and pillars equally with the shrubs; and fortunate was it the vegetables did not suit their taste, otherwise nothing could have escaped their vast hordes. About noon every day they made a sudden halt, and each one reposed where he happened to be. They did not travel any more for the day, but at four in the morning they were once more in motion. They certainly proceeded much quicker than any caterpillars I had witnessed before, and might almost be said to run. On being touched they would immediately eject a drop of greenish fluid on the hand, the stain of which was difficult to wash out. I found, on keeping them, that they were cannibals, and made no objections to eating each other, making the attack on the sides. By the 12th of January scarcely one was to be seen.

"Their pupæ may be found under thistles, as well as peas and other garden vegetables, of a dark red colour, without any protection, merely lying on the earth.

"The moth you will see yourself; it bore no proportion in number to the caterpillar, in fact, was not more plentiful than usual, though it is never abundant."

"Some Account of the Injury sustained by Cherry-trees in Kent, by the Attacks of the Caterpillars of one of the *Geometridæ*." By John Richardson, Esq., M. D., in a letter addressed to the Treasurer, accompanied by specimens of the larvæ and a branch of a cherry-tree, the leaves of which were nearly consumed.

"One farmer, near Chatham, had about forty acres of orchard eaten up year after year for sixteen years, when the insects disappeared for a few seasons, and he had plentiful crops. Last year the enemy returned in force; and, as he naturally anticipates their continuance, he is anxious to discover some method of destroying them. The caterpillar makes its first appearance on the bursting of the blossom, and, as it grows, consumes both flower and leaf. A tree once attacked is sure to be stript, and when nothing green remains on it, the caterpillars descend by webs in long strings to the ground, and then travel to a neighbouring tree, which they plunder in the same manner. The gentleman

from whom Dr. Richardson received the insects and this information had cut off great numbers at this period, by surrounding the stems with quick-lime, which destroys them the instant they touch it: but the lime does not continue active above a day or two, nor after a shower of rain. A tree which has been attacked pushes out a second series of leaves after the insects are gone, which preserves its life, but no blossom appears the second time. One year the leaves of some of the trees were eaten a second time, and these trees died. Cherry-trees, apples and gooseberries are attacked, but whether one or more kinds of caterpillars are concerned in these ravages he had not ascertained. When recent the caterpillars are of a deep green.

"I will have a few of the caterpillars collected and put into a box with earth, to undergo their metamorphosis."

In the discussion which ensued, Mr. Sells and several other members entered into various speculations as to the manner in which the vast number of larvæ described by Mr. Jenyns had from time to time originated, considering it most probable that they had not been introduced into the stomach at once, but at various periods. The Secretary objected to the description of the mode of respiration both by tracheæ and branchiæ, supposed by Mr. Jenyns to be possessed by these larvæ, considering it doubtful whether the lateral appendages of the body possessed any respiratory branchial functions as described by Mr. Jenyns.

The Honorary President returned thanks to the Society for the vote of thanks which had been forwarded to him for his collection of insects.

July 3rd, 1837.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Turton's Systema Naturæ of Linnæus. 3 vols. 8vo., and Yeat's Institutes of Entomology. Presented by the Rev. F. W. Hope.

No. 1 of a Natural History of British Birds. By W. Yarrell, Esq., the Author.

No. 7 of the Magazine of Nat. History. N. S. By the Editor.

Various Italian insects. By Signor Passerini, For. Hon. M.E.S.

Numerous British *Curculionidæ*. By J. Walton, Esq.

Joshua Saunders, Esq., of East Hill, Wandsworth, was elected an Ordinary Member of the Society; and

M. Faldermann, of St. Petersburg, a Foreign Ordinary M. E. S.

The ordinary routine business of the meeting being concluded, it was resolved, that in consequence of the decease of his late Majesty King William the Fourth, and especially out of regard to the Princess Victoria, now Queen of England, the Patroness of the Society, all further scientific business of the meeting should be adjourned, as a mark of respect to the memory of the deceased Monarch.

August 7th, 1837.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Mémoire sur les Hyperines, sur le genre Fulgore, sur le genre Calognathe, et sur le genre Limnadie. All presented by M. F. E. Guérin de Meneville, For. M.E.S., the Author thereof.

No. 8 of the Magazine of Natural History. N. S. By the Editor.

Address of the Earl Stanhope delivered at the anniversary meeting of the Medico-Botanical Society. Presented by that Society.

Andrew Matthews, Esq., M. A., of Weston on the Green, Oxfordshire, was elected an Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

The Rev. F. W. Hope exhibited an imitation coral necklace, which appeared to be composed of paste, and coloured, and which had been destroyed by the larvæ of *Anobium paniceum*, which had burrowed through the beads in various directions. He also exhibited a box made of foreign wood, the surface of which had been

eaten by the larvæ of *Ptinus fur*, which formed oval cells apparently composed of pulverised wood.

Mr. Raddon exhibited specimens of the *Caradrina cubicularis*, one of the *Noctuidæ*, which he had reared from larvæ found in a wheat-stack, some of which he had exhibited at the Society's meeting of the 3rd of April last. He also exhibited some wheat damaged by the larvæ of *Tinea granella*, which had attached many of the grains together by silken threads, feeding in the middle of them. He also exhibited a letter from the celebrated Entomologist Drury to Mr. John Wallcott, having reference to various British *Papilionidæ*, of which the following is a copy.

" Sir,—A little excursion into the country has prevented my answering your favour sooner. A few of the insects mentioned in your list are English; some of which are exceedingly scarce. Others are not so; the particulars of which I here set down.

[*Papilio*] *Populi.*—Two sorts; the English one I can send.

Antiopa.—Exceeding scarce; I do not know where to get it.

Lucina.—English } These I can send.
Maturna.—Ditto }

Lathonia.—Exceeding scarce; I do not know where it is to be got.

Niobe.—Not agreed what it is; I do not know if in England.

Mæra.—English; I can send it.

Circe, Dejanira, Hero, Podalirius, Palæno, Pruni, Arion, Ascanius.—Not English; but I can send many of them.

Virgaureæ.—English; I can send it.

Hippothoe.—English, but exceedingly scarce; said to be found in Cambridgeshire, about Temsford, at this time of the year.

" Thus, you perceive, some of these I can send, which I shall do with great pleasure on receiving your answer. Others I cannot send, nor can I tell where they are to be obtained.

Your answer will oblige, Sir,

Your most humble Servant,

D. Drury."

Strand, July 7, 1786.

Mr. Bainbridge exhibited bundles of apple twigs, from Lambeth, entirely defoliated by the larvæ of *Yponomeuta padella*, which entirely cover the leaves with their webs, which are so strong, that the young leaves cannot burst through them, but are devoured by the larvæ. Likewise a specimen of *Polia nebulosa* (one of the *Noctuidæ*), from the left eye of which a fungus-like excrescence had been produced, of a slender filiform appearance at the base, but bifid and clavate at the tip; it was about the length of the head. The moth had been taken alive with this excrescence attached to it, by Mr. Shipman.

Mr. Yarrell exhibited the branch of a sycamore tree, forwarded by Mr. Barnard, the interior of which had been perforated by the larva of *Zeuzera Æsculi*, which was at that time in the pupa state, the head being directed downwards, and reposing on a layer of fine saw-dust agglutinated together.

Mr. Bowerbank exhibited portions of a cargo of twelve tons of cork, which had been damaged or entirely rendered useless by the attacks of *Dermestes vulpinus* in its different states. With the cork a great quantity of foreign bones, horns, and hoofs had also been imported from Brazil, the ship having also called in Portugal on her way home. The insects had quitted the bones, their ordinary food, and had attacked the cork, boring into it in every direction, as well as into the base of the mast itself, so that great fears were entertained for its safety. Birch and other soft woods had especially been liable to the attacks of the insects, which were found in all states in the burrows which they formed. The same insects had also commenced operations in the neighbourhood of Whitechapel and Saffron Hill, having been imported in foreign bones, and where they bored into and injured the wooden posts. He suggested for their destruction in the vessel the use of essential oil of almonds, and it had been advised that the bottom of the posts should be saturated with coal-tar oil, which would probably render the wood unpalatable.

Mr. Waterhouse recommended the application of corrosive sublimate, or the employment of Kyan's patent liquid.

Mr. Stephens stated, that some years ago the same insect had been exceedingly obnoxious in consequence of its prevalence, not only destroying whole cargoes of skins and bones, but rendering the vessels not seaworthy. He had been present at the British Museum when a merchant offered a reward of £10,000 to Dr. Leach for an effectual remedy against these insects.

Mr. Westwood exhibited a living specimen of the ant-lion

(*Myrmeleon formicaleo*), which he had brought alive from France, and entered into some details relative to its habits and motions. He also exhibited a small collection of singular exotic insects of different orders, and an extensive series of illustrations of the natural history of various insects, of which he gave a verbal account. In this collection were contained the various states of a herbivorous species of *Coccinella* (C. Argus, Pz.), found near Paris by M. V. Audouin, specimens of the insects and nests of *Polistes gallica*, *Osmia muraria*, *Aleyrodes chelidonii*, *Scolytus pygmæus*, *Cnethocampa processionea*, &c.; together with a specimen of the silkworm destroyed by muscardine, of which he gave an account. He likewise gave some account of the present studies of several of the chief Parisian Entomologists, of the proceedings of the Entomological Society of France for July, and of various recent French publications. He also gave some details relative to M. Vallery's plan for preserving corn in granaries from the attacks of *Calandra granaria*, at present under consideration before a committee of the French Institute.

The following Memoirs were read:—

"Description of a New Genus of *Prionidæ*." By G. R. Waterhouse, Esq.

"Note on the *Paussus runcinatus* of Klug." By J. O. Westwood. F.L.S., &c. (see p. 85.)

September 4th, 1837.

J. F. Stephens, Esq., President, in the Chair.

Donations.

No. 9 of the Magazine of Natural History. New Series. By the Editor.

The Athenæum, for August. By the Editor.

Specimens of *Macroplæa Zosteræ*. By R. H. Spence, Esq.

Mr. Bowerbank exhibited and presented living specimens of a very beautiful *Cerambyx*, together with its larva living in pieces of wood, imported from Fernando Po, and reared in the London Docks. The perfect insects had remained alive two or three weeks, and fed only on a little water daily. [Subsequently described by Mr. Newman, under the name of *Rhopalophora*? *re-*

splendens, in the Entomological Magazine, No. XXV., p. 496, by whom several specimens were kept alive for several weeks, by moistening the gauze covering of the tumbler in which they were kept with water, the insects drinking it with avidity, having first ascertained with the tips of their antennæ the precise situation of the drops.

J. T. Hope, Esq., of Netley, Shropshire,
Col. Whithill, of the Hon. East India Company's Service,
The Rev. Edward Higgins, of Bosbury, Hereford, and
Charles J. Thompson, Esq., of George Street, Hanover Square, were elected Ordinary Members of the Society.

Mr. Ingpen stated that the supposed fungus attached to the eye of a moth exhibited at the last meeting had been examined by Mr. Sowerby, who ascertained it to be the anther of a species of *Ophrys*, which had become accidentally attached to the eye.

Mr. Ashton mentioned a proceeding he had found very efficacious in removing spots on the paper of the drawers of insect cabinets, produced by grease exuding from the bodies of insects, by washing the spot with spirits of turpentine, and then scraping pipe-clay over it, one or more applications being sufficient to remove it. Mr. Bowerbank stated that this was the old remedy employed by print-collectors to remove grease spots; by Mr. Ashton's plan a faint boundary line was left, but this might also be removed by washing the spot over with strong alcohol. Mr. Shuckard stated that M. Romand had informed him that a lye from charcoal was equally effectual; but Mr. Newman doubted the ultimate success of these plans, as the spots returned after a time, being only removed from the surface, and the cork beneath acting as a reservoir for the exudation.

The following memoirs were read:—

"Description of the male of *Epomidiopteron Julii*." By M. le Baron de Romand.

"Observations on the Habits of various Species of Indian Insects." By Mr. Benson, in a letter addressed to the Rev. W. Kirby.

October 2nd, 1837.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Bulletin de la Société Impériale des Naturalistes de Moscou, for 1837. Parts 1, 2, and 3. Presented by that Society.

Neue Schmetterlinge, part i. 4to. 1837. By Dr. Klug, the Author thereof.

The Athenæum, for September, 1837. By the Editor.

No. 10 of the Magazine of Natural History. New Series. By the Editor.

Directions for collecting Zoological, Botanical, and Geological Specimens. By J. G. Children, Esq.

No. 21 of the Entomological Magazine. By the Editor.

Purchased by the Society :—

American Entomology. By Thomas Say. Vols. i. and ii.

Fuessly's Archives des Insectes.

Denny's Monographia Pselaphidarum, &c.

Francis Walker, Esq., F.L.S., &c. was elected an Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

Mr. W. W. Saunders exhibited a small collection of insects of various orders from Central India.

Mr. Westwood exhibited portions of the stem of the common hollyhock perforated by *Apion radiolus* to a considerable extent, and also leaves of the same flower gnawed into holes by the same insect, and by *Haltica fuscipes*, which also attacked the flowers, rendering them unsightly. He also mentioned, that as this plant belongs to the same natural family as the common mallow, which is the ordinary food of these insects, the relationship of the two plants was confirmed.

Mr. Westwood also noticed the occurrence of the disease to which the domestic flies are at this season of the year subject, and which Kirby and Spence had considered as a kind of plethora. Mr. Mac Leay had also noticed it at the Liverpool Meeting of the British Association, but had considered it as a new species of fungus, thus proving the possibility of plants growing upon animals; at which meeting Dr. Lindley alluded to the discoveries

recently made abroad relative to the *Botrytis bassiana*, a fungus which infested the silk-worm, of which Mr. Westwood had given an account at the August meeting of this Society. At the present meeting he presented drawings exhibiting the appearance which the excrescence emitted by these flies presented when highly magnified, and added, that from the dispersion of the particles to a considerable distance around the body, it appeared to be a fungus, the sporules of which were thus discharged. When microscopically examined, it appeared to consist of elongated filaments in close contact; when a small portion of it was compressed, it yielded a moisture without the appearance of distinct filaments; but when moistened with water the fibres separated from the mass, some being simple, and others terminated by a minute globule. Those upon the wing appear merely globules. The appearance of these particles variously magnified are represented in Plate XX. fig. 2, *a*, *b*, *c*.

Mr. Shuckard stated, that he had observed other flies besides the domestic fly thus attacked, having seen species of *Scatophaga* in the summer dead upon plants, to which they adhered by their feet. Mr. Shipster stated that he had noticed that flies thus destroyed remained adhering by their proboscis, and Mr. Stephens observed, that he had seen a species of the Hymenopterous genus *Diodontus* destroyed by a similar secretion.

Mr. Westwood also exhibited specimens of the larva of *Agrotis segetum*, which had been very destructive this autumn in some of the midland counties upon turnips. He also gave some account of its mode of attacking those vegetables.

"Notes upon the Black Caterpillar, or Larva of *Athalia centifoliæ*." By Mr. W. Manning. With "Additional Notes" by W. Sells, Esq.

Mr. Manning's communication is as follows:—

"In the summer of 1835, I had twenty-four acres of English turnips entirely destroyed by the black caterpillar, with the exception of about two acres which were not hoed out. I well recollect noticing them on a Saturday morning in July; of their being very numerous; but from the strength of the plants, and looking so luxuriantly, I did not fear much harm. This was a little more than a fortnight or near three weeks after the turnips were up; but on the Monday morning found that part of the field which had been hoed about four days was *entirely destroyed*, and so they went on with this work of destruction, which was the most complete I ever saw. I then stopped the man hoeing the two acres

that were left, and which came to a good crop. Whether the moving the earth by hoeing brought them into existence, or facilitated their perfection or progression, I know not. I also noticed the *Swedes close* by the side of the white turnip were not *touched*. Some of my neighbours drew a hurdle brushed with *smooth* wood down the rows, and with good effect; this method was repeated two or three times. Last year, 1836, I had near seventy acres Swedish turnips, all of which were more or less infested with the black caterpillar. On the English this year not one was seen; their work of destruction seemed to be facilitated by hoeing; for after that operation they increased a thousand fold. I then thought of the ducks, and procured 160 *young* ones (old ones will not work), and kept on the worst part; they soon put a stop to the caterpillars. It was quite amusing to see how fast they would destroy them. The ducks were brought home, and put into a barn, and fed with a small quantity of barley at night, or I should have soon lost all my friends; their new food did not agree with them.

"Pigs will destroy the grub to a very great extent, and without injuring the crop in the *slightest* degree. The sharpest gravel was infested the most both with grub and caterpillar, but the ducks and pigs stuck so closely to them, I have reason to believe they saved the crop. One part of the field was all but destroyed when they (the ducks) were turned in, but I could soon see an evident improvement.

"My loss in the turnip alone, to say nothing of those that followed, could not be less than 100*l.* in 1835."

Mr. Sells's Notes are as follows:—

"1837.

June 15.—Two specimens of the fly came out of pupa; they were male and female.

20.—Three more appeared, which were all males.

22.—Two others appeared, which, it is remarkable, are males also.

The above seven were all the flies I obtained from above 100 larvæ, which had gone into pupæ, the last week of September and first week of October, 1836.

July 20.—Near Arundel, in Sussex, the turnip fields are in some places completely laid waste by the negro caterpillar.

Sept. 9.—The turnips upon Robin Hood Farm, near Kingston, Surrey, having been attacked, and much havoc caused by them, eighty ducks were bought in Lead-

enhall Market, sent down, and turned out. The first day after their journey they would not feed, but on the second they went to business in good earnest, and rapidly cleared the fields of the enemy, so that in a day or two there was scarcely one to be found.

18.—Six acres of turnips on a large farm near me being in progress of destruction, two men were employed to sweep them with an inch rope, and about thirty feet long. It took them an hour at each operation, and was repeated daily for four times with great success. Vast numbers of the *larva* were found dead under the turnips. In the county of Durham, and other parts of England, these insects have been very injurious; and the several means of getting rid of them by ducks, sweeping, and employing children to pick them, have been each successful where *timely applied*, and *properly persevered in*."

" Monograph upon the genus *Macrocephalus*." By J. O. Westwood, F.L.S.

" Observations upon the Bots of Horses." By W. Sells, Esq. In reference to which memoir Mr. Westwood observed, that it appeared to him to be contrary to all analogy to suppose (as Mr. Clark had done) that the larvæ of *Œstrus equi* fed on vegetable matter in the interior of the stomach of the horse, whilst it was so well known that the larvæ of other species of the genus, as the sheep and ox bots, fed upon animal secretions.

November 6th, 1837.

J. F. Stephens, Esq. President, in the Chair.

Donations.

Fauna Boreali-Americana, part iv. The insects by the Rev. W. Kirby, M.A., Hon. Pres. Ent. Soc.

No. 11 of the Magazine of Natural History, New Series. By the Editor.

The Athenæum, for October. By the Editor.

Catalogue of the Library of the United Service Museum. By that Establishment.

Comolli; De Coleopteris Novis Provinciæ Novo-Comi. Presented by Messrs. Villa, of Milan.

The Naturalist for October. By the Editor.

Annual Report of the Leeds Philosophical and Literary Society. By that Society.

Parts 2 and 3 of the Natural History of British Birds. By W. Yarrell, Esq., the Author thereof.

Samuel Stevens, Esq., of King Street, Covent Garden, and Hammersmith, was elected an Ordinary Member of the Society.

Exhibitions, Memoirs, &c.

Mr. W. W. Saunders exhibited a collection of insects which he had recently received from Albania, accompanied by a series of notes upon the habits, &c. of the different species.

"Notice of the Recent Occurrence in London of Ptinus hololeucus of Faldermann." By Mr. W. Bainbridge, M.E.S.

This insect had been captured in some abundance by Mr. J. Norman, of Hoxton, and had been observed by him for several years past in the warehouses of an extensive brush-manufactory near the city. Mr. Norman not collecting *Coleoptera*, and supposing it a common insect, suffered them for a long time to pass unnoticed. The insect, whether in the larva or perfect state, does not appear as yet to do any harm, as it confines itself to feeding on the skin or flesh adhering to the roots of the bristles used in brush-making. The bristles are chiefly imported from different ports in Russia, and there is little doubt but the insect has been introduced into this country by their means. This is in part confirmed by the circumstance of Mons. Faldermann, a Russian Entomologist, having described and figured an insect in the 4th volume of the "Nouveau Mémoires de la Société Impériale des Naturalistes de Moscou," (Tab. VII. 16,) under the name of *Ptinus hololeucus*, so similar to these now before the Society, as to leave little if any doubt of their being the same species.

"Description of Amblythyreus Rhombiventris, a new Exotic Hemipterous Insect." By J. O. Westwood, F.L.S.

"On the Structure of the Wings of the Hemiptera." By R. J. Ashton, Esq., M.L.S.

"On the Production of Hybrid Specimens between *Smerinthus ocellatus* and *S. Populi*." By Mr. Henry House.

"Notice relative to the Ravages of the Larvæ of a small Species of *Anacampsis* (one of the *Tineidæ*), in granaries at Bristol, and of the Larvæ of a Species of *Dermestes*, in a collection of objects of natural history, which had been completely destroyed by it, also

on the occurrence of *Sphinx atropos* in the same neighbourhood, in great quantities." By W. Raddon, Esq.; who states that

"The numbers of the larvæ of the *Anacampsis* are countless; not content with feeding on corn, they feed on the skirting-boards, joists, and rafters of the building. Mr. Spence and his son Robert, who went with me to examine this pest, suggested that perhaps turpentine might destroy them; but that idea was soon perceived to be useless, as on inspection of the rafters, the knots or parts that are the hardest, as well as containing the most turpentine, was the principal or favourite morsels. I brought some away, and placed them on a table, but they eat through the paper, and, as I thought, escaped; but a day or two since I found some of them had eaten into the cork part of my setting boards. Can you suggest any thing that will destroy them, taking into your consideration that the greater part of the building has been built within the last two years, and that is very extensive?"

Mr. Waterhouse suggested that it might perhaps be found serviceable to give the wood-work of granaries attacked in the manner described by Mr. Raddon, a coating of pitch or tar, or to apply Kyan's patent solution.

Mr. Yarrell observed, with reference to the hybrid moths reared by Mr. House, that it would be desirable that an examination of their internal structure should be made from specimens preserved in spirits, if any more should be obtained in the same manner.

Some remarks were made by Mr. Children on the autumnal disease of flies, supposed by Mr. Mac Leay to be of the nature of a fungus, in contravention of that opinion.

Mr. Yarrell made a communication from the Earl of Derby of a feather of a harpy eagle in his possession, infested with a species of *Nirmidæ*, numbers of which were seen when alive running in and out of the quill of the feather, by a very minute hole they had made near its root.

PROSPECTUS

OF

PRIZE ESSAYS

ON THE

SUBJECT OF NOXIOUS INSECTS AND REMEDIES FOR THEIR DESTRUCTION.

IN consequence of no Prize Essays having been received upon the subject of the LARGE CATERPILLAR which feeds upon the root of the TURNIP, (being the larva of AGROTIS SEGETUM,) it has been determined to continue the same as the subject of the Essays for the ensuing year, by the ENTOMOLOGICAL SOCIETY and the AGRICULTURAL SOCIETY OF SAFFRON WALDEN; by each of which Societies the sum of Five Guineas has been offered as a Premium for the best Essay upon this insect.

The Essays must be accompanied by testimonials of the success of the remedies proposed by the writers, and must be forwarded to the SECRETARY of the ENTOMOLOGICAL SOCIETY (at No. 17, Old Bond Street), with fictitious signatures, on or before the Fourth Monday in January, 1840, when they will be referred to a Committee to decide upon their respective merits; after which, with the permission of the Writers, both the Prize Essay, and any others of value, will be published.

The Essays must be respectively accompanied by a sealed letter, indorsed with the fictitious signature adopted by each Author, and inclosing the real name of the Writer.

JOURNAL OF PROCEEDINGS.

December 4th, 1837.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Bulletin de la Société Impériale des Naturalistes de Moscou. 1837. No. IV. And

Réglement de la Société Imp. Nat. de Moscou. Both presented by that Society.

Der Naturforscher. 27 vols. 8vo. Presented by the Rev. F. W. Hope.

Genera et Species Curculionidum. Tom. IV. Pars I. By the Author, C. J. Schönherr, For. Hon. M.E.S.

The Athenæum for November. By the Editor.

G. F. Shipster, Esq. was elected an Ordinary Member of the Society.

Memoirs, Exhibitions, &c.

Mr. F. Smith exhibited a specimen of *Halictus nitidiusculus* ♀, in the abdomen of which two Strepsipterous insects were inclosed.

Mr. Westwood gave some account of the three following memoirs by Professor Wesmael of Brussels recently published.

1. On a hermaphrodite Ichneumon, in which the anterior part of the body is female and the posterior male.
2. On a hermaphrodite *Argynnis Paphia*, in which the right side is male and the left female.
3. On a deformed individual of *Nymphalis populi*, captured near Brussels, which still retained the head-case of the larva inclosing the head-case of the pupa, as well as the head of the imago, in an immature state of developement.

Mr. Westwood also mentioned that a monstrosity similar to the latter case was described in *Der Naturforscher*, observed in a specimen of *Cerura vinula;* and contended that the observation of M. Wesmael absolutely proved that the head of the imago was contained within the head of the larva, and did not occupy two segments as asserted by Dr. Ratzeburg and Mr. Shuckard, this opinion being still maintained by the latter. Mr. Newman stated that immediately previous to *moulting* the head of the enclosed larva was to be found beneath the first segment of the body, and entirely disengaged from within the head of the still enveloping skin. Mr. Westwood contended that this was not to be considered as a proof that the head of the enclosed larva occupied the head and anterior segment of the old skin, but that it was the necessary result of the disengagement of the enclosed larva from its surrounding membrane, and of the endeavours used by the enclosed larva to effect a passage by its head through a fissure down the back. Mr. Shuckard, on the other hand, considered it not impossible that the membranous covering of the first segment of the larva in M. Wesmael's specimens might have shrivelled up, leaving the head of the butterfly enclosed in the head of the larva alone, and not in the head and first segment, as it ought to do according to the theory of Dr. Ratzeburg.

Mr. Westwood also gave an account of the Canon Schmidberger's observations on *Psilus Boscii*, contained in Kollar's work on insects obnoxious to vegetation recently published, [and included in Miss Loudon's Translation of that work published subsequently.]

The following Memoir was read:—

"Observations respecting various Insects which have at different Times afforded Food to Man." By the Rev. F. W. Hope.

January 1*st*, 1838.

J. F. Stephens, Esq., President, in the Chair.

Donations.

On the Temperature of Insects. Parts I. and II. (From the Philosophical Transactions.) By George Newport, Esq., the author thereof.

Magazine of Natural History. New Series. No. 12. By the Editor.

The Athenæum for December. By the Editor.

The Entomological Magazine. No. 21. By the Editor.

The Naturalist for November and December, 1837. By the Editor.

Edward Charlesworth, Esq., F.G.S., of Leicester Square; and T. W. Maltby Esq., of Turnham Green,
were elected Ordinary Members of the Society.

Memoirs, Exhibitions, &c.

Mr. Hanson exhibited a large collection of North American insects collected by Messrs. Doubleday and Forster.

Mr. Hope exhibited a portion of a splendid collection of insects collected by Colonel Whithill in the Concan and Ceylon.

Mr. Raddon exhibited a quantity of Cayenne pepper, in which a number of specimens of *Anobium paniceum* had been reared. Likewise some portions of the external parts of insects found imbedded in peat at the depth of fifty feet in digging the foundation of a bridge at Bristol.

Mr. Shipster exhibited the nest of a trap-door spider from Southern Australia, in which the door, instead of being circular as in *Ct. nidulans*, was semicircular and attached by a transverse section on one side.

Mr. Spence communicated an extract from a provincial paper, giving an account of an advantageous mode of getting rid of the wire-worm in its attacks on turnips by employing boys to collect the worms at the price of *2d.* or 1½*d.* per 100, by which means the number of 18,000 had been collected in one field, which at the former price would cost 1*l.* 2*s.* 6*d.*, a sum well expended by saving an acre of turnips worth from 5*l.* to 7*l.* As many as fifty worms had been found in a single root. Mr. Hope also stated that he had found the larvæ of one of the *Elateridæ* abundant in turnips, and also that the common earwig had during the past autumn abounded to an extraordinary degree in various parts of England. At Cheltenham *Forficula borealis* had appeared in countless myriads, and by far the greatest number of specimens which he had examined were infested with *Filariæ*, three or four being often found in one individual.

Mr. Stephens also stated that he had found the earwig extremely abundant at Camberwell, whilst Messrs. Ingpen and

Westwood had noticed but very few specimens at Chelsea and Hammersmith.

The following Memoirs were read:—

"Observations on the Use of the Antennæ of Insects." By George Newport, Esq.

"Description of a Hybrid *Smerinthus*, with Remarks on Hybridism." By J. O. Westwood, F.L.S.

Mr. Hope, in allusion to the latter of these papers, stated that it was a well-known fact that the offspring between the setter and pointer, allowed only to breed *inter se*, would in the course of three generations exhibit indications of a tendency towards the characters of the male parent. Mr. Yarrell also stated that in those hybrid fowls which he had examined he had found the male organs to be in excess, and the reverse to be the case with the female parts, the ovaries being very slightly developed. He also stated that it was a common practice amongst the breeders of cage birds, resulting from such excess of the male organs, to make use of one of these rank mules to bring forward slow hens, which would not pair, but which, when excited by the presence of the mule bird, was brought into the presence of the male bird. He had known the bullfinch cross with the canary, which were the most widely apart of any birds hitherto known to produce hybrids.

Anniversary Meeting, January 22nd, 1838.

J. F. Stephens, Esq., President, in the Chair.

In pursuance of the By-laws, the four following gentlemen were removed from the Council:

W. S. Mac Leay, Esq.	Samuel Hanson, Esq.
W. W. Saunders, Esq.	W. Sells, Esq.

and the four following gentleman elected in their stead:

R. J. Ashton, Esq.	F. Walker, Esq.
J. S. Bowerbank, Esq.	C. Darwin, Esq.

And the following gentlemen were elected officers for the ensuing year:

President	J. F. Stephens, Esq.
Treasurer	W. Yarrell, Esq.
Secretary	J. O. Westwood.
Curators	Messrs. Shuckard and Westwood.

Mr. Yarrell, on behalf of the auditors of the treasurer's accounts, read an abstract thereof, and made a verbal communication concerning the prosperous state of the affairs of the Society.

J. F. Stephens, Esq., the President, then read an address upon the state of the Society, its views, progress, and prospects.

It was resolved that a vote of thanks should be given to the President for his address, and that he should be requested to allow the same to be printed for distribution amongst the members.

It was announced that two prize essays upon *Athalia centifoliæ* had been received, and that they had been submitted to a committee to examine and report on their respective merits.

February 5th, 1838.

J. F. Stephens, Esq., President, in the Chair.

Donations.

The Coleopterist's Manual. Part I. By the Rev. F. W. Hope.

Catalogue of the Hemipterous Insects contained in the Collection of the Rev. F. W. Hope. Both presented by the Rev. F. W. Hope.

Genera et Species Curculionidum. Tom. IV. Pars II. By C. J. Schönherr, For. Hon. M. E. S.

The Athenæum for January. By the Editor.

The Magazine of Natural History for February. By the Editor.

No. 22 of the Entomological Magazine. By E. Newman, Esq.

Sixty-one Species of minute British Hymenoptera. By F. Walker Esq.

William Frederick Evans, Esq., of the Admiralty, and of Elm Place, Brompton, was elected an Ordinary M. E. S.; and

M. Louis Agassiz, of Neufchâtel, an Ordinary Foreign M.E.S.

The President nominated the following gentlemen to act as Vice-Presidents during the ensuing year:

The Rev. F. W. Hope.	W. E. Shuckard, Esq.
J. G. Children, Esq.	C. Darwin, Esq.

Exhibitions, Memoirs, &c.

Mr. Shipster exhibited a large collection of Coleopterous insects obtained by him from the rough turpentine.

Mr. Hope exhibited a selection from a collection of insects made by E. T. Downes, Esq., Assistant Surgeon at Neemuck in the East Indies, including a new Paussideous insect (*Platyrhopalus angustus*, Westw.), a Dipterous insect closely allied to *Sphryrocephala* (Say), a large species of *Cermatia*, a *Solpuga*, a *Pimelia*, a very large *Onitis*, *Oiceoptoma tetraspilota*, &c. Alluding to the last-mentioned insect, Mr. Hope opposed the opinion that Necrophagous insects were of great rarity in India, believing their apparent rarity to have originated in the prejudices entertained by the native castes against touching dead bodies. He moreover considered, from the exhibition now made, that there must be a considerable agreement between tropical Asia and Africa.

The Rev. L. Jenyns exhibited an apod larva, of which three individuals had been found during the preceding summer in the key-hole of a writing-desk, embedded in a mass of clay, without any food having been apparently laid up in store.

The completion of Mr. Newport's Memoir on the Use of the Antennæ was read; in support of the observations in which, Mr. Hope entered into various remarks upon the different senses, considering that there was an intimate connexion between sight and hearing (the one being requisite to obtain clear perceptions of the objects causing impressions upon the organs of the other sense), and which seemed to be proved, amongst the *Longicorn* beetles, by the antennæ being inserted in a deep notch of the eye. He was hence induced to consider that the sense of hearing existed in insects either in the terminal or basal joint of the antennæ. The ordinarily minute size of the second joint seemed to him as likely to have for its object the condensing of the sound carried along the nerves of the elongated terminal joints, and which afterwards diverged in the large basal joint.

Mr. Newport stated that he had recently, at the request of Mr. Hope, made some anatomical observations upon the internal parts of the head in the region of the base of the antennæ, and that he had discovered the two membranes of which Treviranus had spoken. At the base of the antennæ in *Blatta* he had discovered a free space, inclosing a membrane over which passed a branch of the nerve from the base of the antennary nerve, without the intervention of a sac.

Mr. Westwood, in reference to some observations made by Mr. Newport on the excitement previous to impregnation of a species of *Pteromalus* by the contact of the antennæ of the opposite sexes, stated that he had observed the latter operation in other species of that family, and that the act of impregnation itself occurred in the ordinary manner, the vagina of the female being situated near the base of the abdomen beneath. He likewise considered that the proceedings of the house-fly, so often observed in autumn, did not constitute copulation, but were merely acts of excitement.

March 5th, 1838.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Proceedings of the Zoological Society, from January to September, 1837. By that Society.

Annales de la Société Entomologique de France. 1837. Livr. 3. Presented by that Society.

Bulletin de la Société Imper. des Naturalists de Moscou. 1837. Part 5. By that Society.

The Magazine of Natural History. No. 15. By the Editor.

Description of new Species of Coleoptera. By M. Zoubkoff.

Letter to his Royal Highness the Duke of Sussex. By Mr. Donaldson.

The Athenæum for March. By the Editor.

The Annals of Natural History. No. I. By the Editors.

Exhibitions, Memoirs, &c.

Mr. Raddon exhibited a portion of gum containing insects which he considered to be gum *Copal*, and another portion without insects which he named *Animè;* and made some observations on the distinction between these two substances. Mr. Hope, however, considered that both portions of gum were *Animè*, retaining his opinion that the *Copal* never contained insects. There was great difficulty in tracing the original country of these gums, the dealers mixing them promiscuously, but he believed that the gum produced in the Old World was insectiferous, whilst that exuding from trees in the New World was not. There was also great difference between the same gum at different times, that which was a year old being much paler than that which was four years old.

Mr. Hope also stated that he had prepared several outline maps, with a view to facilitate the knowledge of Entomological Geography, and requested the assistance of members in filling up the outlines.

Mr. Raddon stated, upon the authority of a friend, that the noise produced by *Acherontia atropos* is occasionally made whilst the insect remained in the pupa state, immediately before bursting forth, and stated his opinion that the sound proceeded from the head.

Mr. Saunders exhibited a beautiful specimen of *Urania Rhipheus*, captured on board a vessel in the Mozambique Channel many leagues from land.

Mr. Bainbridge exhibited three Coleopterous and two Lepidopterous insects which had been greatly infected with grease, but which had been cleansed by immersion in petroleum, the colours of the *Lepidoptera* not appearing to be affected by the process. Mr. Shuckard stated that this remedy had been long previously suggested by Treitschke.

The following Memoirs were read:—

"Description of a new Strepsipterous Insect from South America." By Robert Templeton, Esq., R.A.

"Notes upon the *Staphylinidæ*." By Fred. Holme, Esq.

"Description of *Platyrhopalus angustus*." By J. O. Westwood.

April 2nd, 1838.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Notices sur les Ravages causés par la Pyrale de la Vigne.

Considerations nouvelles sur les Dégats occasionnés par la Pyrale de la Vigne.

Recherches Anatomiques et Physiologiques sur la Maladie contagieuse qui attaque les Vers à Soie.

Nouvelles Expériences sur la Maladie contagieuse qui attaque les Vers à Soie. All presented by M. V. Audouin, Foreign Hon. M. E. S., the Author thereof.

Entomologische Beitrage, von C. H. G. von Heyden. Presented by the Author.

The Magazine of Natural History. No. 16. By the Editor.

Observations made by order of the Meteorological Society. By that Society.

Mr. Henry G. Bohn, of York Street, Convent Garden, was elected an Ordinary Member of the Society; and

M. Sahlberg, of Finland, an Ordinary Foreign Member.

Exhibitions, Memoirs, &c.

Mr. Bainbridge exhibited a monstrous *Clivina fossor*, in which the right antenna was furcate and considerably incrassated.

Mr. Shipster exhibited a preparation of the human eye in spirits, to which a specimen of *Latridus porcatus* was attached, and which it was considered had become accidentally attached during the process of preparation.

Mr. Barker, M.E.S., informed the meeting that the minute house-ant had been observed to be driven away by washing the places it frequented with water in which the outer green skins of walnuts had been soaked.

Mr. Westwood, in alluding to Mr. Templeton's discovery of a Strepsipterous insect in the body of one of the Brazilian *Sphegidæ* described at the last meeting of the Society, stated the discovery of two chrysalides of another species of the same order, in the abdominal cavity of *Ammophila sabulosa*, recorded by M. Léon Dufour (*Ann. Sci. Nat.*, January, 1837); and Mr. Hope stated that he had found at Southend specimens of the same sand-wasp having the abdomen swollen, and which he had attributed to some disease, but which he was convinced was produced by the presence of *Strepsiptera*.

Mr. Westwood also noticed the observation of M. Dufour in the memoir above alluded to, in which a parasite larva found in the interior of the body of *Andrena aterrima* was observed to have one of its extremities attached to one of the great trachean vesicles of the bee by two of the trachean tubes arising therefrom which penetrate into the body of the parasite, and which afforded some confirmation of the observations made by him on the connexion of the pupa of the *Stylops* with the bee described by him in these Transactions (vol. i. p. 170).

Mr. Westwood also noticed, in connexion with Mr. Spence's observations made at a previous meeting upon the minute parasites found upon the outside of the pupæ of *Scolytus destructor*, that M. L. Dufour had discovered numerous minute worms in the

viscera of the imago of *Tomicus typographus* like *Vibrio*, described by him in his *Récherches Anatomiques sur les Coléoptéres.*

The Memoirs read were—

" Monograph on the Genus *Holoptilus.* By J. O. Westwood, F.L.S.

The conclusion of Mr. Hope's Memoir on Edible Insects.

" Facts proving that the best remedy for clearing turnip-fields is found in the use of poultry for that purpose." By W. Sells, Esq.

In a previous communication made to the Society on the 3rd October, 1836, Mr. Sells stated that at Compton, in Surrey, a turnip-field, of eight and a half acres, was, in the preceding year, completely demolished by *Athalia centifoliæ.* A thunder-storm, accompanied by heavy rain, destroyed myriads of them, so that, as it was described to him, basketsful might have been swept up on following morning. The country people called them the black army, and said they had not been seen there for twenty-five years before. Mr. Sells then mentioned the occurrence of the negro caterpillar at Long Ditton, Ham, and near Guildford, where its ravages had been equally severe.

Mr. Sells then proceeded to state: " On Sept. 26th I examined some turnip-fields near Kingston, and found them suffering from the negro caterpillar, though comparatively in a slight degree at present. Having taken a boy of about ten years old with me, I desired him to pick them off the leaves, and timed him by my watch, in order to ascertain the number he collected in a given time. I found that he gathered them at the rate of 180 in an hour, which being followed up for eight hours only a day, would give about 1500, or 9000 a week; so that ten or a dozen children, of from six to ten years old, under the superintendence of a man, would collect, even where they are relatively few, as many as 90,000 or 100,000 a week. I proposed this plan to the farmer who rents the land, and he has promised me to act upon it immediately. I recommended his paying the children so much for a given measure of the caterpillar, as at the rate of 6*d.* a pint, and the man 2*s.* a day." Mr. Sells then observed upon the little benefit to be derived from the use of tobacco water, quick lime, or soot; brushing the caterpillars off the plants with brushes drawn over the fields, with ropes, or ploughing up the parts of the field where they first appear in order to prevent their further progress. He further observed that where they are numerous they might be brushed off into little pans or shovels formed somewhat like a heart, but with a deeper notch in front so as to allow them to be

pushed under the leaves of the plant, as on the least disturbance they coil up and roll off.

"If ducks and poultry could be induced to eat these caterpillars, it would be a cheap, convenient, and expeditious mode of removing them. In America, turkeys are turned into the tobacco plantations to pick off the larvæ of a *Sphinx*, which would otherwise devastate them; and in the West Indies the large cockroaches with spiny legs are a *bonne bouche* for the fowls, as in provision stores numbers of them are often found in empty flour barrels, when it is the practice to call the fowls and shake the cockroaches out of the barrel or box upon the ground, when they are greedily eaten by the poultry. If ducks and fowls were made to fast a few hours to quicken their appetite, they would very likely eat a quantity of these larvæ, given either alone or mixed with barley, and might thus by a little management be brought to first feed upon them and then to seek them in the fields."

In the present communication Mr. Sells states: "In the early part of last summer I took every opportunity of urging strongly upon the farmers, in the neighbourhood of Kingston and elsewhere, their making a fair trial of this best (beyond all question) of the remedies that have been devised for the extirpation of their enemy. I have now received the particulars of several instances wherein the use of poultry has been perfectly successful and they are as follows.

"Mr. W. M., a very intelligent farmer, at Elston, Bedfordshire, wrote last July: 'In the summer of 1835 I had twenty-four acres of English turnips quite destroyed. In 1836 I had near seventy acres of Swedes, all of which were more or less infested; on the English this year not one was seen. Their work of destruction seemed to be facilitated by HOEING, *for after that operation they increased a thousandfold.* I then thought of the ducks and procured 160 *young* ones (old ones will not work), and kept them on the worst parts. They soon put a stop to the caterpillars; it was quite amusing to see how fast they would destroy them. The ducks were brought home and put into a barn, and fed with a little barley at night, or I should have lost all my friends, as their new food did not agree with them. My loss of turnips in 1835 only could not be less than £100.'

"Mr. P., at the Robin Hood farm, had his turnip fields last year invaded by the black army (as they have been called in Devonshire). He procured eighty ducks at Leadenhall Market, and turned them out. The first day they did not take kindly to their business, but on the following they went to work in good

earnest and quickly accomplished their allotted task. That the ducks throve upon their new food, I had a positive proof in a *fine* couple of them which were obligingly sent me.

" Capt. W., of Long Dutton, also reports favourably of his obligations to the ducks; adding that turkeys would not touch the caterpillar, but that fowls were equally useful with the former.

" At Chertsey last year two adjoining farms were visited by the blacks. The farmer upon one of them put 150 fowls, most of them about half grown, into a waggon, which was drawn into the middle of his turnip-field, where they were turned loose, and quickly annihilated the caterpillars. His neighbour, Mr. L., the owner of the other farm, hearing of this fact, sent to borrow the fowls; they were immediately lent, and promptly rendered the same important service to him which they had done for their owner.

" The above particulars afford satisfactory proofs of the great advantages of using poultry, as the most certain, direct and complete means of destroying the black caterpillar; while all the other remedies which have been proposed, as sweeping with a rope, hand-picking, sprinkling quick lime, watering the fields with salt water, &c. are comparatively merely palliative, partial and imperfect in their operation, and not to be relied on. There is one point I would recommend to the attention of the farmer—that he should carefully preserve some of his expert, practised hunters of one year, in order that they may (if unluckily required) render him similar services in a subsequent one; and with this further advantage, that they would, by their example, induce the younger birds to commence their operations without loss of time. It is evidently of great consequence that the first appearance of the caterpillars should be carefully watched, and not be allowed to pass unregarded; but that, as soon as they are discovered, a number of young ducks or fowls, or both, should forthwith be set to work.

" What effect the intense cold experienced in January last may have upon the future appearance of *Athalia centifoliæ* must at present be problematical, but when we recollect that it remains in state of larva, enclosed in a slightly organized cocoon, at no great depth in the ground, through the winter, and that, moreover, there was no covering of snow upon the earth during the extreme severity of the weather, it may reasonably be expected that the numbers of this destructive insect will be very considerably reduced for some years to come." [See also the observations of Messrs. Sells and Manning, ante, p. lxiv.]

Dr. Blundell stated, in connexion with Mr. Sells's remarks, that he had observed that in the southern states of North America as well as in England the partridges which feed upon a large ant are better flavoured than the ordinary ones. Mr. Sells also added that poultry are fed in the West Indies upon the larvæ of ants or white ants, men being regularly employed to collect the nests of those insects in the woods and bring them home.

Mr. Sells also stated that the larvæ of *Prionus damicornis* are eaten both by the blacks and creoles in the West Indies.

May 7th, 1838.

J. F. Stephens, Esq., President, in the Chair.

Donations.

Proceedings of the Berwickshire Naturalists Club for 1837. Presented by the Club.

No. 17 of the Magazine of Natural History. By the Editor.

Fabricii Entomologia Systematica. 2 vols. Presented by the Rev. F. W. Hope.

Nos. 23 and 24 of the Entomological Magazine. By the Editors.

The Athenæum for April. By the Editor.

No. 1 of an Introduction to the Modern Classification of Insects. By J. O. Westwood, the Author thereof.

Charles Thurston Thompson, Esq., of Bedford Place, Kensington; and

J. W. Horsley, Esq., of Turnham Green,

were elected Ordinary Members of the Society.

Memoirs, Exhibitions, &c.

Mr. Sells exhibited specimens of *Copris lunaris* and of the cocoon in which they pass the pupa state, and which appeared entirely to consist of vegetable matter.

Mr. Evans exhibited a specimen, accompanied by a figure, of *Notonecta glauca*, to the hind tibiæ of which were attached certain oval masses resembling eggs, and which were considered to be the ova of one of the water mites described as a distinct animal under the generic name of *Achlysia*.

Mr. Ashton exhibited a collection of specimens of insects of various orders in spirits from Barbadoes.

The Rev. George May presented a piece of pear-tree bored to the centre by the larva of *Zeuzera Æsculi*.

Mr. C. Curtis exhibited a domestic fly attacked by a great number of small *Acari*, which had attached themselves to the extremity of the body around the anus.

Mr. Yarrell exhibited a number of the larvæ of one of the *Longicorn beetles* which had been discovered by Mr. Leadbetter in a case of stuffed birds, where they were found to have so extensively burrowed into the branches upon which the birds were fixed as to render it necessary to remove them. The case had been closed for the last seven years, so that the insects must have remained so long in the egg or larva state.

Mr. Aldous presented a plain and coloured highly magnified figure of the head of the flea recently published by him, exhibiting the various parts of the mouth as they appear in the solar microscope.

Mr. Ingpen communicated the following notes upon the economy of *Brachinus crepitans*, and *Sirex duplex*:—

"*Brachinus crepitans* has been taken in immense profusion by Mr. Shipman on a bank in the Duke of Somerset's Park at Wimbledon, in the last week in April. On pulling down a part of the bank the ground was literally black with them, but on visiting the same spot a week afterwards a few only were found, and those by twos or threes under stones in the vicinity. What could be the cause of their congregating together in such a mass? Had they but just arrived at their perfect state? If so, the larvæ must be gregarious. The specimens, however, were perfectly mature. On killing some of the specimens in scalding water, one of them struck him in the face with its *fundamental artillery* at the distance of fifteen inches, at which times the abdomens of the females were distended to double their ordinary size.

"Several specimens of *Sirex duplex* were taken in the house of Mr. Edwards, at Henlow, Beds. The house had been built about three years when the family were very much alarmed by the appearance of these insects, at first few in number, but subsequently '*by thousands*.' Innumerable holes in the floors of the rooms were made by the insects large enough to admit a small pencil case. There could be no doubt of their having been imported in the timber (which is supposed to have come from Canada), and therefore they must have been considerably more than three years in arriving at their perfect state."

The following observations by Mr. Sells on the perforations of the larvæ of *Sirex juvencus*, were omitted in the Journal of Proceedings of the 1st of February, 1836, and are here introduced in connexion with Mr. Ingpen's remarks on *Sirex duplex*:—

"In tracing the mining operations of the larva of *Sirex juvencus* in the small sample of the wood submitted to my examination, they appear to be mainly carried on in a zig-zag manner; the insect proceeding either in a straight course with the fibre of the wood, diagonally, or tortuously, according to the texture it has to deal with, to the extent of an inch and half or two inches; it then eats its way transversely, and that very wisely only for a space just sufficient to allow of its turning round, when it advances about the same distance as at first, turns again and so on.

"The firmly compacted substance which completely fills the cylindrical passages formed by the insect, I apprehend to be its excrementitious rejectamenta; it is almost entirely composed of fine wood powder, is quite uncoloured by the secretions of the larva, and can admit but a very small supply of air for respiratory purposes.

"The pieces of wood which I have seen have all the perforations of the same size, as though formed by insects of the same bulk.

"Messrs. Kirby and Spence, when speaking of the indirect injuries caused by insects, confine their remarks on this subject to saying—'Mr. Stephens informs me that the fir-trees in a plantation of Mr. Foljambe's in Yorkshire, were destroyed by *Sirex gigas*, while those of another belonging to the same gentleman in Wiltshire met with a similar fate from *Sirex juvencus*.' Now as it is always desirable to unite the utile with the dulce in scientific inquiries, and we should grant fair attention to the popular question of cui bono in these matters, it is worth while to inquire into and endeavour to trace out the whole history of this mischievous borer; and first, of the places and seasons wherein the female *Sirex* deposits her eggs, as it is probably in that state only that the enemy would be practically assailable, and its course of destruction be arrested.

"It occurs to me that the young larvæ may feed upon the alburnum, or soft parenchymatous parts of the inner bark, and thus in fact do more injury to the tree as regards its vitality than when it afterwards operates upon its solid internal parts. Upon these subjects it is not unlikely that some members of the Society may afford satisfactory information."

Mr. Westwood, in reference to the remark made by him at the

meeting of the 2nd October, 1837, reported in p. lxvi., *ante*, and in the Entomological Magazine, No. 22, p. 185, on the analogy which might be supposed to exist between the food of the larvæ of the *Œstrus equi* and *bovis*, observed that Mr. Clark had noticed this analogy in his Memoir on the Bots (p. 22), although he had stated further that the food of the bot was *most probably* the chyle or chyme. Mr. Sells defended his former opinion, which Mr. B. Clark had opposed in the Entomological Magazine, No. 24, adding that the bots were not found in that portion of the stomach in which the chyle or chyme was secreted.

The Rev. F. W. Hope communicated the following lists of the genera and species of insects infested by *Filariæ*, with the names of the persons by whom observed, and other memoranda relative to the occurrence of the same.

40a

COLEOPTERA.

1. *Cychrus rostratus*, Rev. F. W. Hope; taken at Netley, Salop.
2. *Carabus morbillosus*, Rev. F. W. Hope; three cases.
   nemoralis, J. F. Stephens, Esq., Middlesex, &c.
   violaceus, Messrs. Stephens, Henslow and Hope; Cambridge and Shropshire.
   catenulatus, J. F. Stephens, Esq., Middlesex, &c.
   monilis, J. F. Stephens, Esq,, Middlesex, &c.
3. *Abax striola*, Messrs. Stephens and Hope, Essex and Middlesex.
4. *Steropus madidus*, Messrs. Holme, Stephens and Hope; Oxfordshire, Middlesex, and Netley; of frequent occurrence.
5. *Sphodrus leucopthalmus*, Messrs. Stephens and Hope; in cellars, London and Middlesex.
6. *Pristonychus terricola*, F. W. Hope; Southend, Essex, 1832, and Middlesex, 1836.
7. *Pœcilus cupreus*, J. F. Stephens, Esq., Middlesex.
8. *Calathus Stephensii*, F. W. Hope, Berkeley, Gloucestershire.
9. *Harpalus æneus*, J. F. Stephens, Esq., Middlesex.
   ruficornis, J. F. Stephens, Esq., Middlesex.
   binotatus, J. F. Stephens, Esq., Middlesex.
10. *Pelorus blapoides*, Rudolphi, Prussia?
11. *Acilius sulcatus*, F. W. Hope, Netley, Salop.
12. *Colymbetes ferrugineus*, F. W. Hope, Netley, Salop.
13. *Necrophorus vespillo*, F. W. Hope, Netley, Salop.
14. *Silpha obscura*, Rudolphi, Prussia?
15. *Buprestis* (species unknown), Rudolphi, Prussia?

16. *Blaps mortisaga*, Messrs. Stephens, Jenyns, Hope and Rudolphi (see also Baker on the Microscope), Middlesex, Southend, and Prussia.
17. *Adimonia alni*, Rudolphi, Prussia?
18. *Galleruca tanaceti*, Rudolphi and F. W. Hope, Netley, 1836.

2. Dermaptera.

Forficula auricularia, J. O. Westwood, observed in dissection.
auricularia, Messrs. Babington, Riley, Rudolphi and Hope; Bristol, many instances; Prussia? and Netley.
(species unknown), Léon Dufour in his *Mem. sur les Labidoures.*

3. Orthoptera.

1. *Locusta hemitogia*, Rudolphi, Prussia.
verrucivora, Rudolphi, Prussia.
viridissima, Messrs. Rudolphi and Stephens, Prussia and Middlesex?
2. *Gryllus* (species unknown), F. Holme, Esq., in the Ashmolean Museum.

4. Neuroptera.

Phryanea (species unknown), Rudolphi, Prussia.
(species unknown), F. W. Hope; many species are infested.
(species unknown), F. W. Hope; eleven specimens in one insect, in Oct. 1836, Netley.

5. Hemiptera.

1. *Cercopis spumaria*, Rudolphi, Prussia.
2. *Coccus* (species unknown), J. O. Westwood, in my Cabinet.

6. Hymenoptera.

1. *Tenthredo*, larvæ of, Rudolphi, Prussia.
2. *Bombus* (species unknown), — Owen, Esq., in the College of Surgeons.
terrestris, Rudolphi, in Prussia.

7. Diptera.

Chironomus plumosus, Rev. L. Jenyns, Cambridge?

8. Lepidoptera.

Papilionidæ.

Vanessa polychloros, Messrs. Stephens and Rudolphi, Middlesex.
urticæ, Rudolphi and F. W. Hope, Salop and Prussia.
antiopa, Rudolphi, Prussia.

Sphingidæ.

1. *Smerinthus tiliæ*, F. W. Hope, Sussex.
2. *Dcilephila euphorbiæ*, Rudolphi, in the larva.
3. *Hepialus humuli*, F. W. Hope, in his Cabinet.
4. *Notodonta ziczac*, Rudolphi, Prussia.
5. *Lasiocampa quercus*, Rudolphi, Prussia.
trifolii, Rudolphi, Prussia.
6. *Leucoma salicis*, Rudolphi, infested by *Filaria*.
7. *Bombyx alni*, Rudolphi, infested by *Filaria*.
8. *Arctia caia*, Rudolphi and F. W. Hope, Prussia and Essex.
9. *Catocala nupta*, Rudolphi, by *Fil. acuminata*.
10. *Ennomos cratægata*, J. F. Stephens, Esq., Middlesex.
11. *Pyralis pomana*, Rudolphi, Prussia.
12. *Yponomeuta padella*, Rudolphi, by *F. truncata*.

The commencement of a monograph on the Coleopterous genus *Popillia*, by Edward Newman, Esq., F.L.S., was read.

ADDITIONS TO THE LIBRARY,

FROM

DECEMBER 31, 1836, TO SEPTEMBER 30, 1840.

Anderson (J.), Sketch of the Comparative Anatomy of the Nervous System. 1 vol. 4to.
Annals of Natural History. No. 1.
Annales de la Société Entomologique de France. 1836, Pt. 1 and 4; 1837, Pt. 1, 2, 3, 4; 1838, Pt. 1, 2.
Athenæum for 1837—1840.
Audouin, Description of Melöe Collegialis.
———— Memoire sur l'Artemie Saline.
———— Observations on a Case of Calculus found in the Body of Lucanus Cervus.
———— Notice sur les Ravages causés par la Pyrale de la Vigne.
———— Considérations nouvelles sur les Dégats occasionés par la Pyrale de la Vigne.
———— Récherches Anatomiques et Physiologiques sur la Maladie contagieuse qui attaque les Vers à Soie.
———— Nouvelles Expériences sur la Maladie contagieuse qui attaque les Vers à Soie.
————, and L. Dufour, Memoirs on the Genera Odynerus and Ceroplatus.

Bagster (Samuel), The Management of Bees. London. 1834.
Barcelona (Royal Society of), Inauguraçion de las Encenancas gratuitas.
Bees, The Natural History of, from the French. 1744.
Bee-Keeper: a short and simple letter to Cottagers by a Conservative. Oxford. Without date.
Bee-Society, Hints for promoting a London. 1796.
Bee-Keeper's Manual.
Berendt, Die Insecten im Bernstein.
Berwickshire Naturalists Club, Proceedings of, for 1836—1839.
Bevan (Edw.), The Honey Bee. 2nd Edit.
Blackwall (J.), Researches in Zoology. 1 vol. 8vo.
Bonar (James), A Treatise on the Natural History of Bees. Edinburgh. 1796.
Booth, The Stranger's Intellectual Guide to London.
Bromwick, B. J., The Experienced Bee-Keeper. London. 1783.
Bruxelles, Nouveaux Mémoires de l'Academie Royale des Sciences et Belles Lettres de. Tom. 11. 1838. Tom. 12. 1839.
———— Bulletin de l'Acad. Royale des Sciences, &c. de. Tom. 1—5. Tom. 6. Parts 1 & 2.
———— Annuaire de l'Academie Royale des Sciences, &c. dc. 5me Année. 6me Année.

Bulletin de la Société Impériale des Naturalistes de Moscou. 1837. Pts. 1—8. 1838. Pts. 1—4.
Burmeister (H.), Account of the Progress of Entomology for 1835.
—— —— —— Memoir on the Natural History of the Genus Calandra.
—— —— —— —— Beitrage zur Naturgeschichte der Rankenfusser.
—— —— Handbuch der Entomologie. Vol. 1. Vol. 2. Pts. 2 and 3.
—— —— —— —— Genera Insectorum. Pts. 1—5.
Butler (Charles), The Feminine Monarchy, or the History of Bees. 1704.

Carus, Entdeckung eines Einfachen vom Herzen aus beschleunigten Blutkreislaufes in den Larven netzfluglicher Insecten. Leipzig. 1827.
Catalogue of the Library of the United Service Museum.
Children (J. G.), Directions for collecting Zoological, Botanical and Geological Specimens.
Clark (Bracy), Memoir on the Œstridæ. 4to.
Comolli, De Coleopteris novis Provinciæ Novocomi.

Dahlbom (Prof.), Synopsis Hymenopterologiæ Scandinaviæ.
Dana and Whelpley, Description of Argulus Catostomi.
Denny (H.), Monographia Pselaphidarum et Scydmænidarum. 1 vol. 8vo.
Dodd (J. S.), Essay on the Herring. 1752.
Donaldson, Letter to H. R. H. the Duke of Sussex.

Education, Recent Measures for promoting.
—— —— Substance of the Marquis of Lansdowne's Speech on.
—— —— Substance of Lord J. Russell's Speech on.
Entomological Magazine. (13 Nos.)
Erichson (Dr.), Die Kafer der Mark Brandenburg. Pts. 1 and 2. 8vo.
—— —— —— Genera et Species Staphylinorum. Pt. 1.

Fabricius, Entomologia Systematica. 2 vol. 8vo.
Faldermann, Additamenta Entomologica ad Faunam Rossicam.
—— —— Bereicherung zur Kaferkunde des Russischen Reichs.
Fridvaldsky, Monographia Serpentium Hungariæ.
Fuessly, Archives des Insectes. 1 vol. 4to.

Gedde (John), A New Discovery of an excellent Method of Bee-Houses. 1676.
Germar, Zeitschrift für die Entomologie. Vols. 1, 2.
Gistl, Systema Insectorum. Fasc. 1. 8vo.
—— Enumeratio Coleopterorum Agri Monacensis. 8vo.
—— Description of Mesoclastus Paradoxus.
Goedartius de Insectis. 8vo. 1685.
Gray (J.), Dental Practice.
Guérin (F. E.), Memoire sur les Hyperines.
—— —— —— Memoire sur le Genre Fulgore.
—— —— —— Memoire sur le Genre Calognathe.
—— —— —— Memoire sur le Genre Limnadie.
—— —— —— Revue Zoologique. Nos. 1, 2. 8vo.
—— —— —— Description des Crustacés et Insectes de la Favorite.

Hailstone, Description of a new Species of Eurynome. (From the Mag. of Nat. Hist.)

Haliday (A. H.), Hymenoptera Britannica. Alysia.
——————————————— Oxyuri. Pt. 1.
Hancock (J.), Observations on British Guiana.
Harris (Dr. Thaddeus W.), Descriptive Catalogue of the North American Species of Sphinx.
Hartig (Dr. Theod.), Die Aderflugler Deutschlands. 1ter Band.
Heyden (C. H. G. Van), Entomologische Beitrage. 4to.
Hogg (John), On the Classification of the Amphibia. (From the Mag. Nat. Hist.)
Hope (Rev. F. W.), Description of Dolichoscelis Haworthii. (From the Linnæan Transactions.)
——————— The Coleopterist's Manual. Parts 1, 2, 3. 8vo.
——————— Catalogue of the Hemipterous Insects contained in the Collection of. Part 1. 8vo.
——————— Observations on the Lamellicorn Beetles. (From the Mag. Nat. Hist.)
——————— On a new Species of Lamia, from the Swan River. (From ditto.)
——————— Observations on the Genus Cassida. (From the Annals of Natural History.)
——————— Memoir on the Entomology of the Himalaya Mountains. (From Professor Royle's work on the Himalaya.)
Huber (F.), New Observations on the Natural History of Bees. 1821.
Huish (R.), The Cottager's Manual for the Management of his Bees. 1820.

Ingpen (Abel), Instructions for collecting Insects, &c. 2nd Edit.
Institut. Vol. 3. Paris. Fol.
Isaac (J.), The General Apiarian. Exeter. 1799.

Jerdan (W.), Suggestions for a National Association for Protection of Authors.
Journal of the English Agricultural Society. Part 1.
Journal of the Natural History Society of Boston. Vol. 1. No. 4. Vol. 2. Nos. 1—4. Vol. 3. Nos. 1, 2.

Keys (John), A Treatise on the Breeding and Management of Bees. 1614.
Kirby (Rev. W.), Fauna Boreali-Americana. Part 4.—The Insects. 1 vol. 4to.
Klug (Dr. F.), Neue Schmetterlinge. 4to. Part 1.

Levett (John), The Ordering of Bees. 1634.
Lille, Memoires de la Société Royale des Sciences de. 8vo. 13 vols. 1811, 1819, 1823, 1826 (2 vols.), 1828, 1829, 1831, 1832, 1833 (2 vols.), 1834, 1835.
Linnæus, System of Nature. By Turton. 3 vols. 8vo.
Linnæan Society, Transactions of. Vol. 12.
Lumley's Bibliographical Advertiser.

Magazine of Natural History. New Series. For 1837—1840.
Mannerheim (Comte), Enumeration des Buprestides de la Collection de. 8vo.
——————————— Memoire sur un Nouveau Genre de Coleoptères de Mozambique.

Mannerheim (Comte), Observations Critiques sur quelques Ouvrages Entomologiques.
——————————— Revue Critique de quelques Ouvrages recemment parus.
Memoires de la Société de Physique de Genève. Vol. 1, 2, 5, 6. Vol. 7. Pt. 2. Vol. 8. Pts. 1, 2. 4to.
Mills (John), Essay on the Management of Bees. 1766.
Moscow, Reglement de la Société imper. des Naturalistes de. (See Bulletin.)

Naturalist, The. For October, November, and December, 1837. No. 21. And 12 Nos.
Naturforscher, Der. 27 vols. 8vo.
Newport (G.), Memoir on the Temperature of Insects. Pts. 1 and 2. (From the Philosophical Transactions.)
——————— The Article Insecta (from the Cyclopædia of Anatomy and Physiology.)

Observations made by order of the Meteorological Society.

Patterson (R.), Memoir on Cydippe Pomiformis.
——————— Letters on the Insects mentioned by Shakspeare. 12mo.
Perchéron, Bibliographie Entomologique. 2 vols. 8vo.
Pictet (J.), New Species of Neuroptera from the Neighbourhood of Geneva.
——————— Note on the Respiratory Organs of the Capricorns.
Pohl and Kollar, Account of the Chigoe, translated by W. E. Shuckard. (From the Mag. of Nat. Hist.)
Proceedings of the Zoological Society, January, 1837, to November, 1839.
Purchas (Samuel), A Treatise of Political Flying Insects. 1657.

Réaumur, Memoires pour servir à l'Histoire des Insectes. 6 vols. 4to.
Report, Annual, of the Leeds Philosophical and Literary Society. 1837, 1838.
Rocca (L'Abbé de la), Traité complet sur les Abeilles. 3 vols. 8vo. Paris. 1790.
Romand (Baron de), Tableau de l'Aile supérieure des Hymenoptères.
Roser (V.), Catalogue of Wurtemberg Coleoptera.
Royal Society, Philosophical Transactions of, for 1836, Pts. 1, 2; 1837, Pts. 1, 2; 1838, Pts. 1, 2.
——————————— Proceedings of, for 1836, 1837. November to December, 1838.
——————————— List of Fellows of, 1836, 1838.
——————————— Anniversary Address of H. R. H. the President for 1837, 1838.
Rusden (Moses), A further Discovery of Bees. 1679.

Say, American Entomology. Vols. 1, 2.
Schomburgk (Rob. H.), Description of British Guiana.
Schonherr (C. J.), Genera and Species Curculionidum. Tom. 4. Part 1. Part 2. 8vo.
Selys-Longchamps, Catalogue des Lépidoptères de Belgique.
Shuckard, Treatise on the Fossorial Hymenoptera of Great Britain. 1 vol. 8vo.
——————— Elements of British Entomology. Part 1.
——————— Monograph on the Dorylidæ.
——————— (*see* Spry.)
Spectacle de la Nature, translated from the French. 1783.

Spence (W.), On the Insects which attack Elms. (From the Arboretum Britannicum.)
Spinola (Maximilien), Essai sur les Genres d'Insectes appartenants à l'Ordre des Hémiptères et à la Section des Hétéroptères. 1 vol. 8vo. Genoa. 1837.
Sprengel, Commentarius de partibus quibus Insecta spiritus ducunt.
Spry and Shuckard, British Coleoptera delineated. 1 vol. 8vo.
Stanhope (Earl), Address delivered at the Anniversary Meeting of the Medico-Botanical Society.
Stephens, Illustrations of British Entomology. No. 85.
——— Manual of British Coleoptera. 1 vol. 8vo.

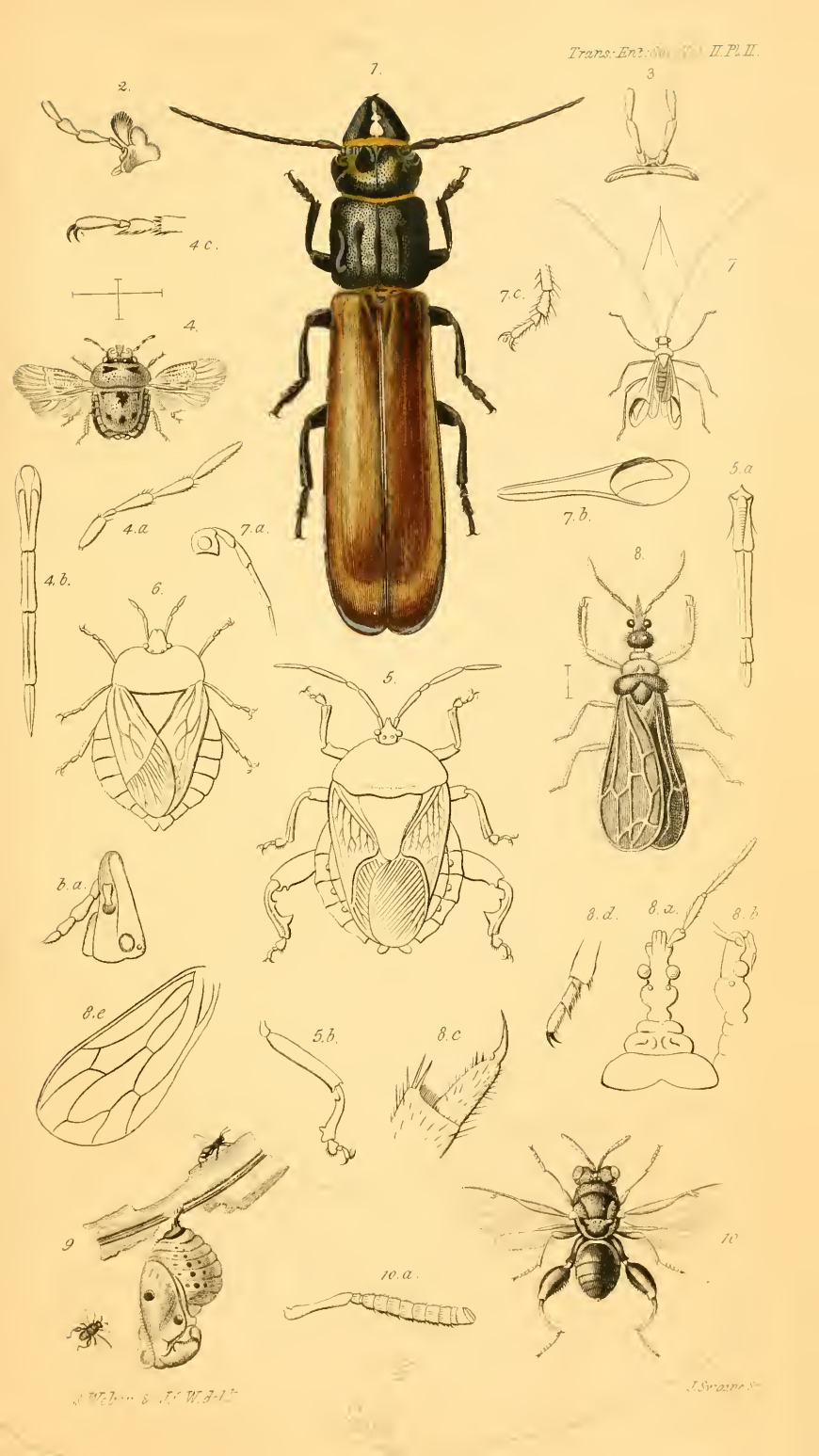
Tennant (T. O.), The Natural History of the Elephant. 1781.
Thorley (Rev. J.), Melisselogia, or the Female Monarchy. 1744.
Transactions of the Zoological Society. Vol. 2. Pts. 2, 3, 4.
Treatise on the Nature, Economy and Practical Management of Bees. 1817.
Trembley, Art of Hatching Fowls. 1750.

Villa, Alterum Supplementum Coleopterorum Europæ.

Walckenaer (Baron), Histoire Naturelle des Insectes Aptères. 1 vol. 8vo. And 3 Fascicles of Plates.
Walker (F.), Monographia Chalciditum. Pts. 1 and 2.
Warder (Joseph), The True Amazons, or the Monarchy of Bees. 1726.
Waterton (C.), An Ornithological Letter to W. Swainson.
Wentworth, The Cocker's Companion. 1762.
Wesmael, Monographie des Braconides de la Belgique.
——— Monographie des Odynères de la Belgique; et Suite.
Westwood, Description of the Genus Embia. (From the Linnæan Trans.)
——— On the Modern Nomenclature of Natural History. (From the Mag. of Nat. Hist.)
——— Some Account of a Congregation of Moths found in an Acacia Tree. (From ditto.)
——— An Introduction to the Modern Classification of Insects. 2 vols. 8vo.
——— Descriptions of some new Species of Sacred Beetles. (From the Transactions of the Zoological Society.)
——— Observations on the Genus Carapterus. (From the Entomological Magazine.)
White (S.), Collateral Bee-Boxes, 1756. Another Edition, 1764.
Wildman (Daniel), A Complete Guide for the Management of Bees. 1775. 20th Edit. 1819.
Worlidge (J.), Vinetum Britannicum, to which is added a Discourse teaching the best Way of improving Bees. 1678.

Yarrell (William), A Natural History of British Birds. Nos. 1, 2, 3. 8vo.

Zoological Society. *See* Proceedings—Transactions.
Zoubkoff, Descriptions of new Species of Coleoptera.

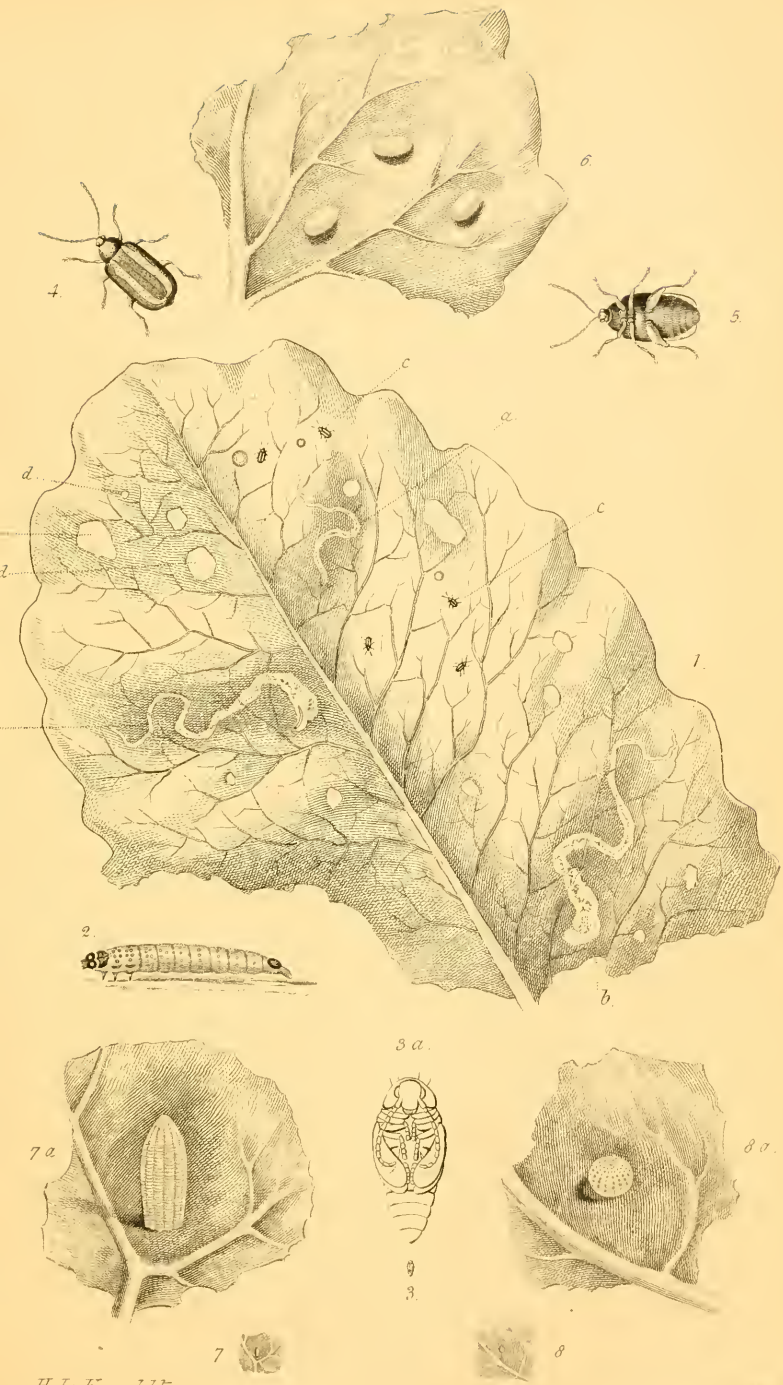

2.
7.
3
4 c.
7
7 c.
4.
5.a
4.a
7.b.
7.a.
4.b.
8.
6.
5.
8.d.
8.a.
8.b
8.e
5.b.
8.c
9
10
10.a.

7.
6.
5.
4.

3.
1.
2.

8.
5a.
5b.

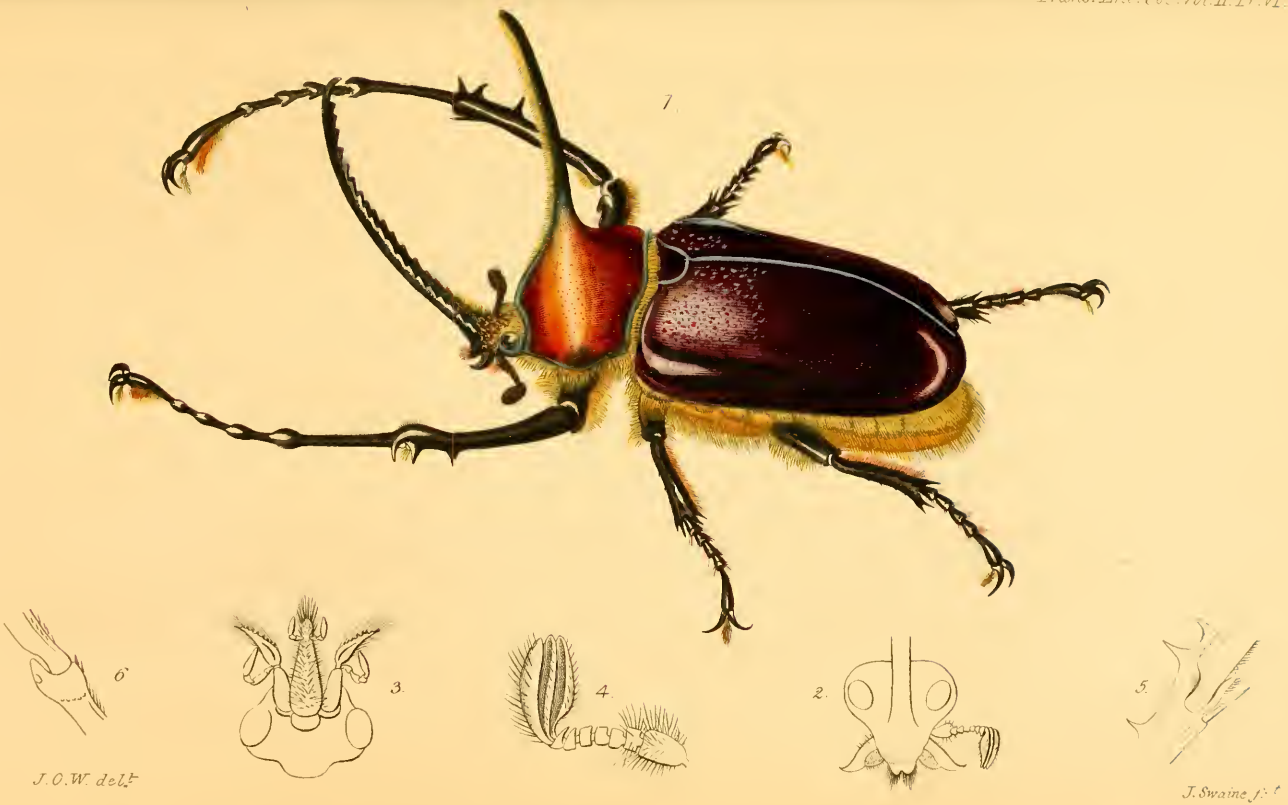
Ha. tiria nemorum, p 24

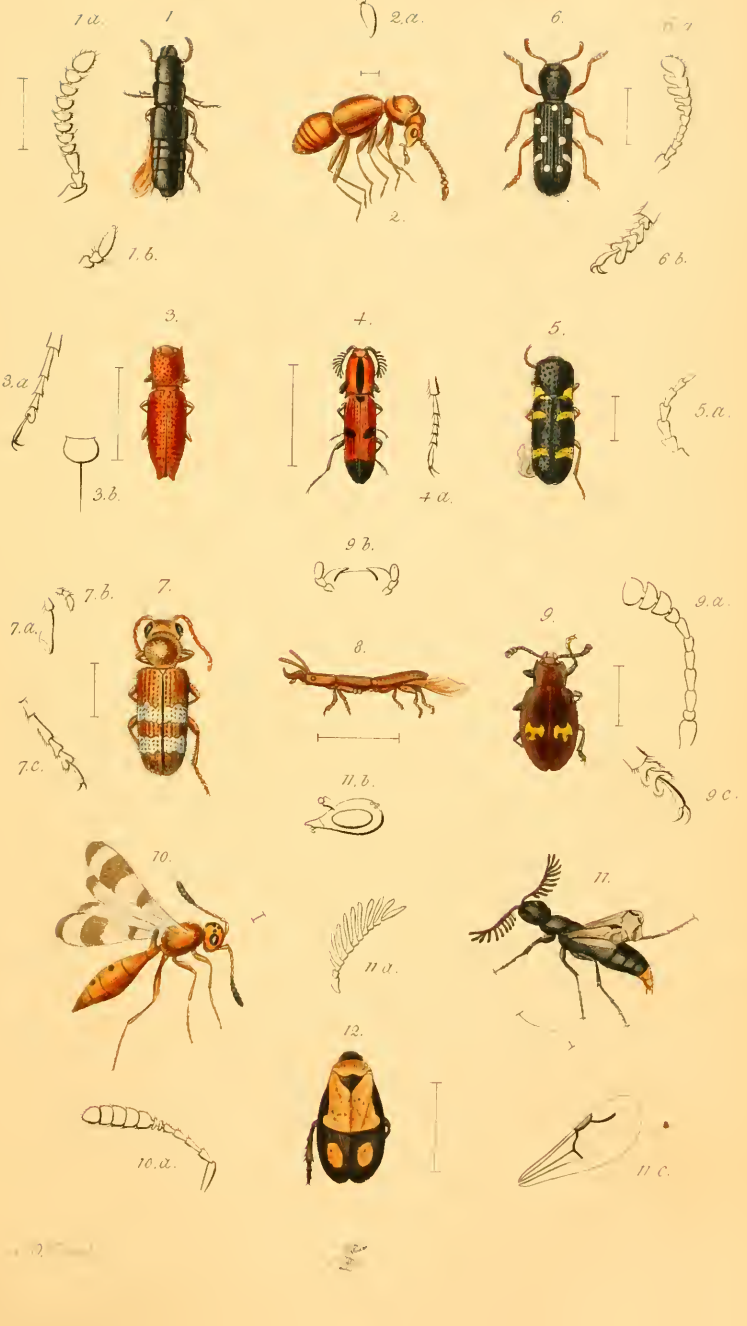


H. Le Keux del.

1.
2.
6.
3.
10.
22.
7
8.
9.
11.
12.
4.
5.
14.
15.
19.
21.
20.
16.
17.

Golopha porteri Hope, Venezuela

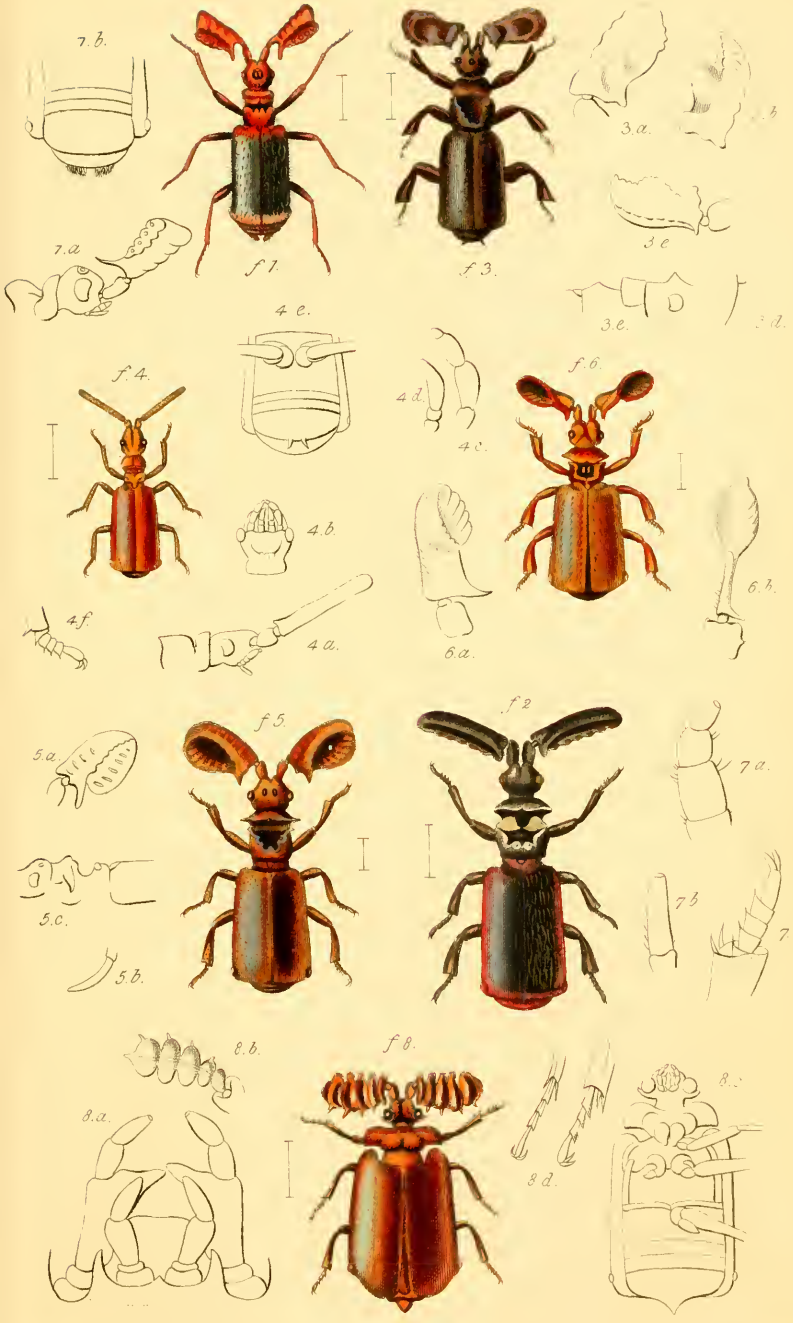

1.
6
3.
4.
2.
5.
J. O. W. del.t
J. Swaine f.t

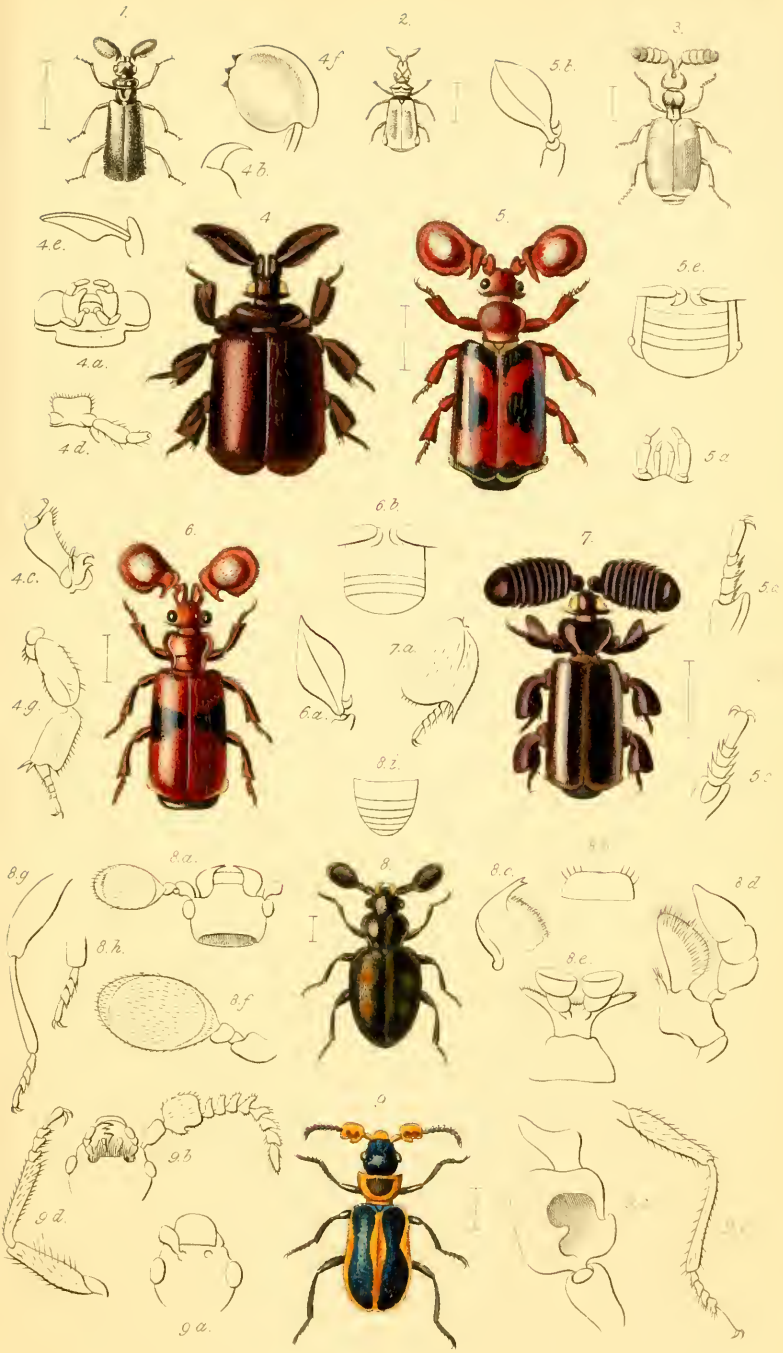

1 a.
1
2.a.
6.
6 a.
1. b.
2.
6 b.
3.
4.
5.
3.a
5.a.
3.b.
4 a.
9 b.
7.b.
7.
9.a.
7.a.
8.
9.
11. b.
7.c.
9 c.
10.
11.
11 a.
12.
10.a.
11 c.

1

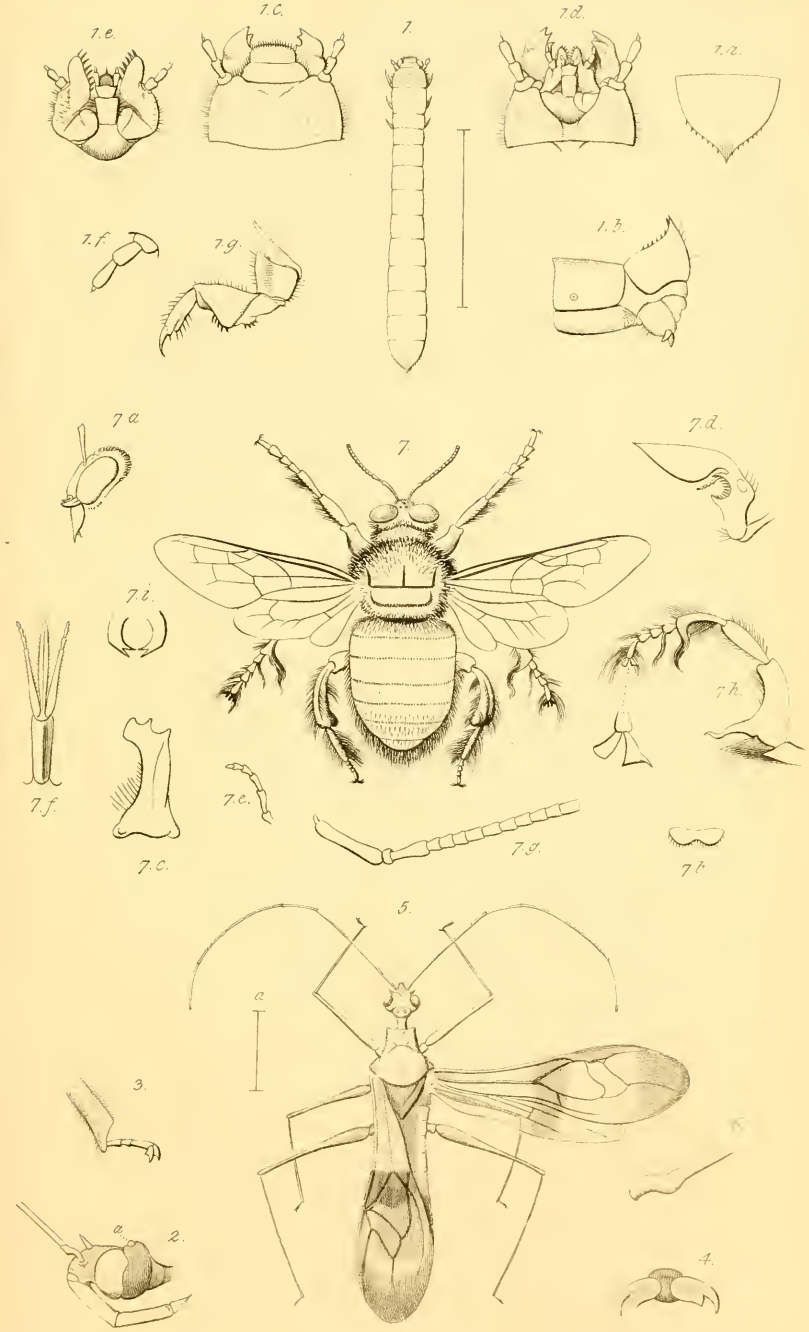
2.

3.

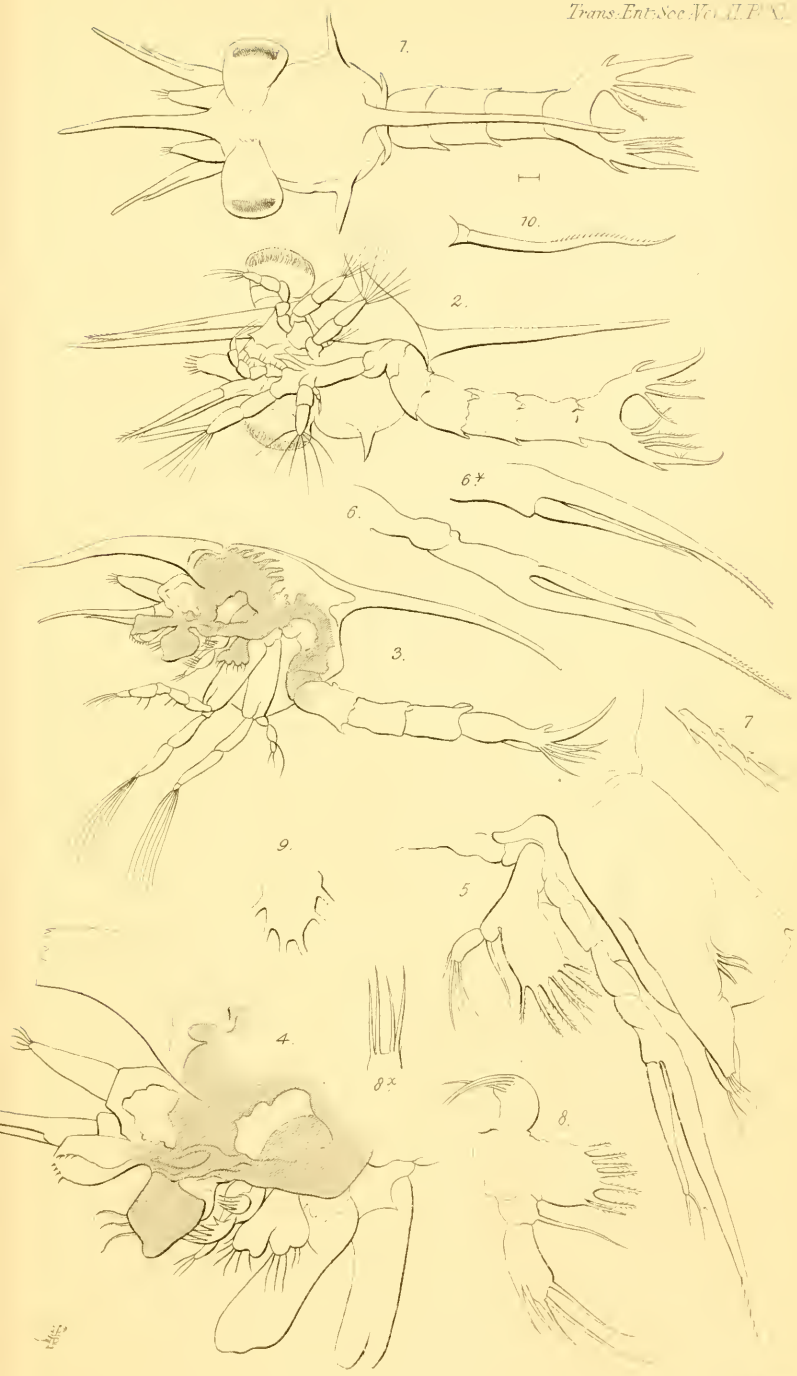

7.b.
7.a.
f.1.
f.3.
3.a.
3.b.
3.c.
3.e.
3.d.
4.e.
f.4.
4.d.
4.c.
f.6.
4.b.
4.f.
4.a.
6.a.
6.b.
f.5.
f.2.
5.a.
5.c.
5.b.
7.a.
7.b.
7.c.
8.b.
f.8.
8.a.
8.d.
8.c.

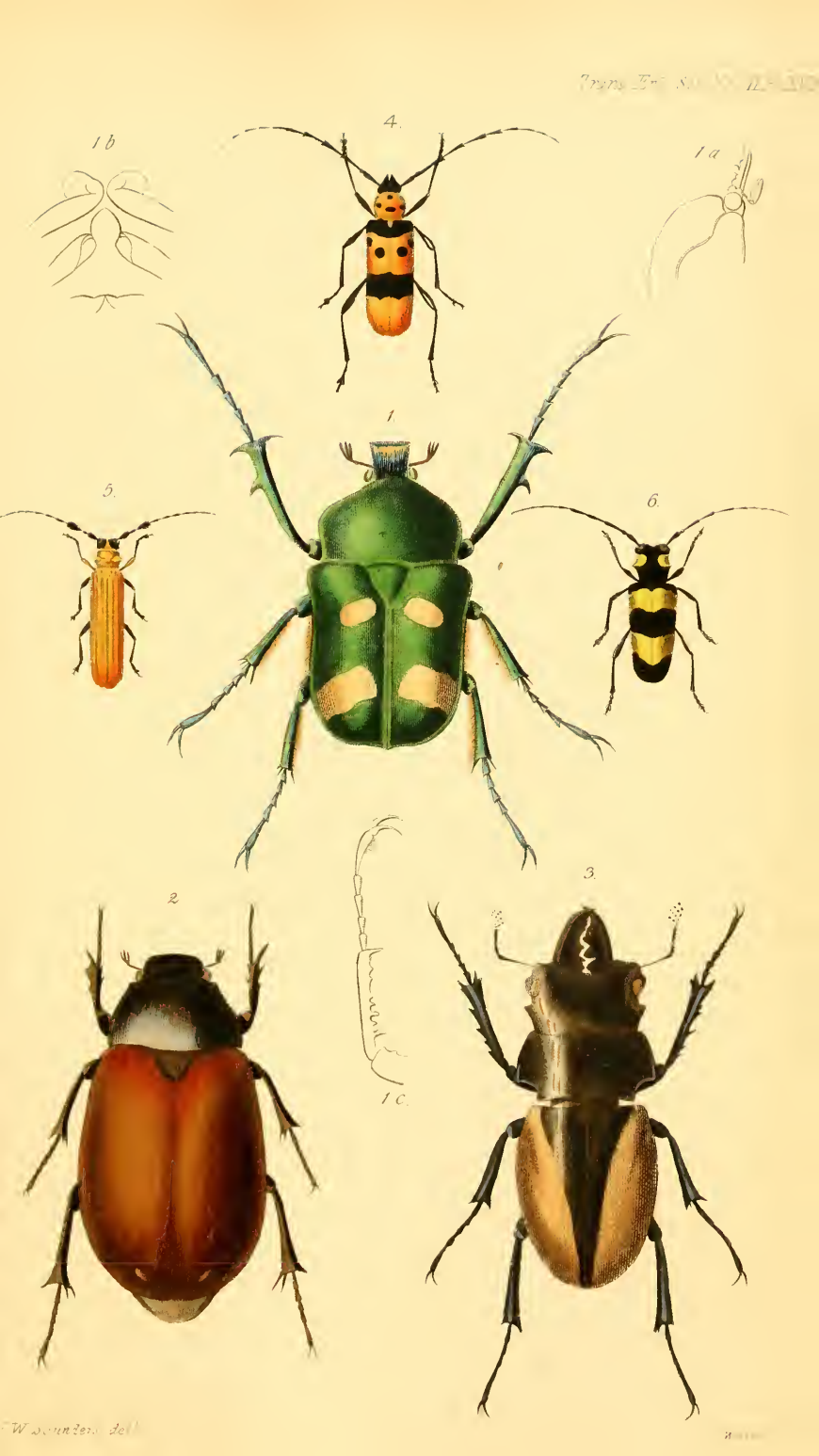

1.
2.
3.
4.f
4.b.
5.b.
4.e.
4
5.
5.e.
4.a.
4.d.
5.a
6.b.
6.
7.
4.c.
5.c
7.a.
4.g.
6.a.
8.i.
5.c
8.g
8.a.
8.
8.c.
8.d
8.h.
8.e.
8.f
9
9.b
9.d.
9.a.

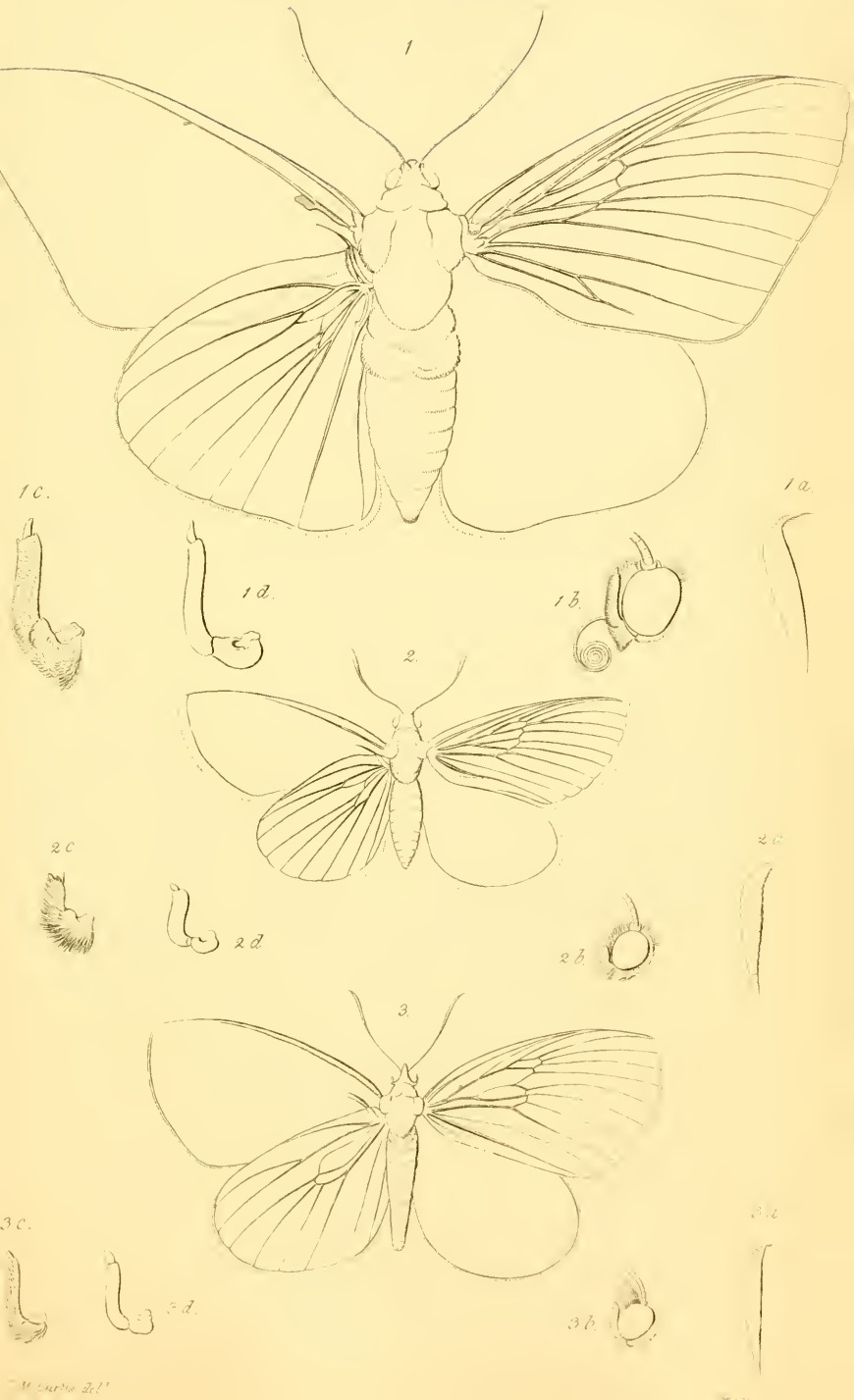
I.O.W. del.t

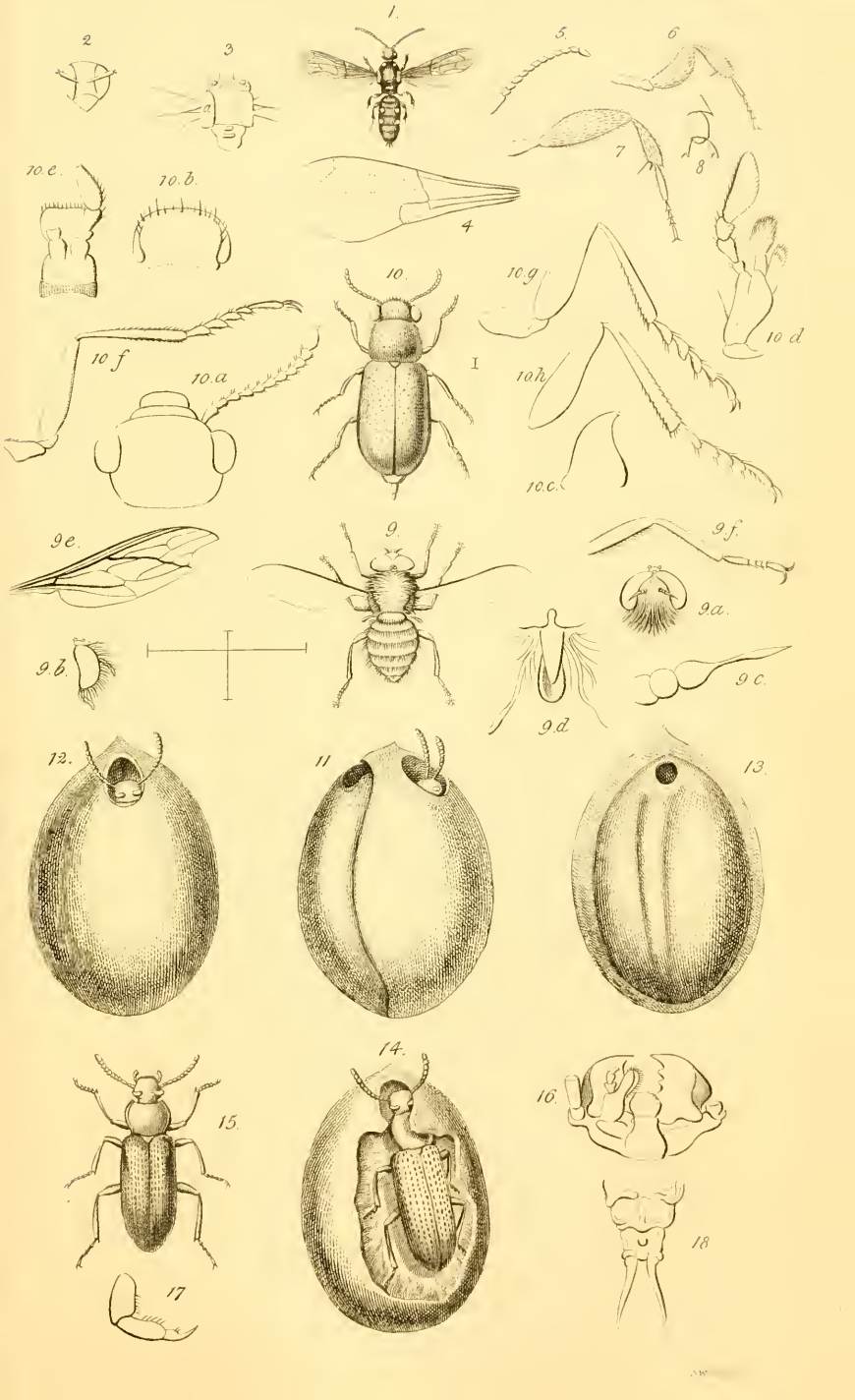


A.H.H. JOW. & H.B. del.t


1.
10.
2.
6*
6.
3.
7
9.
5
4
8*
8.


1b
4.
1a
1.
5.
6.
2.
3.
1c.


1
1c.
1d.
1b.
1a.
2.
2c
2d
2b
2a
3.
3c.
3d.
3b.
3a


1.
2
3
4
5.
6
7
8
10.
10.a
10.b.
10.c.
10.d
10.f
10.g
10.h
9.
9.a.
9.b.
9.c.
9.d.
9.e.
9.f.
11
12.
13.
14.
15.
16.
17
18

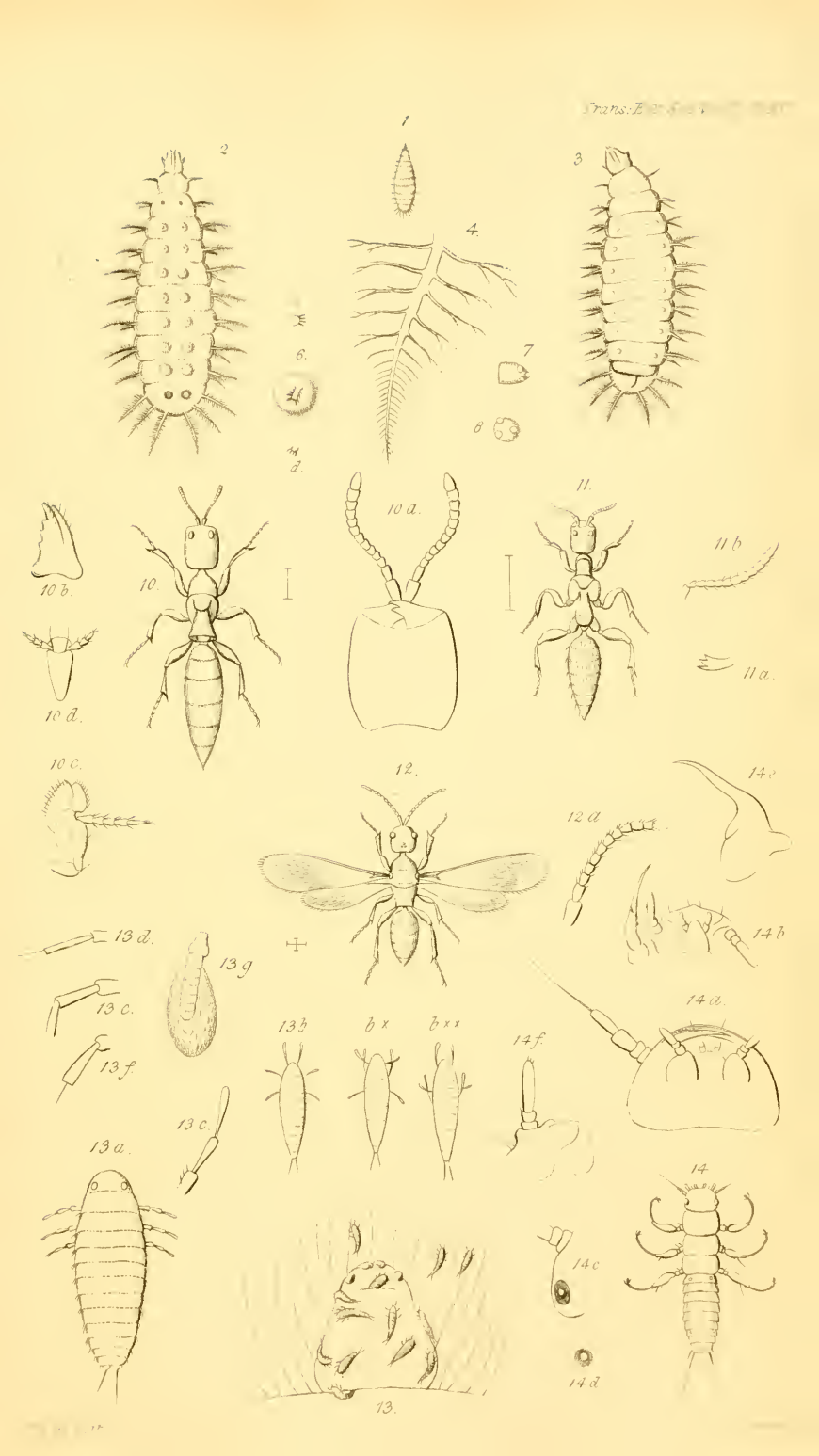
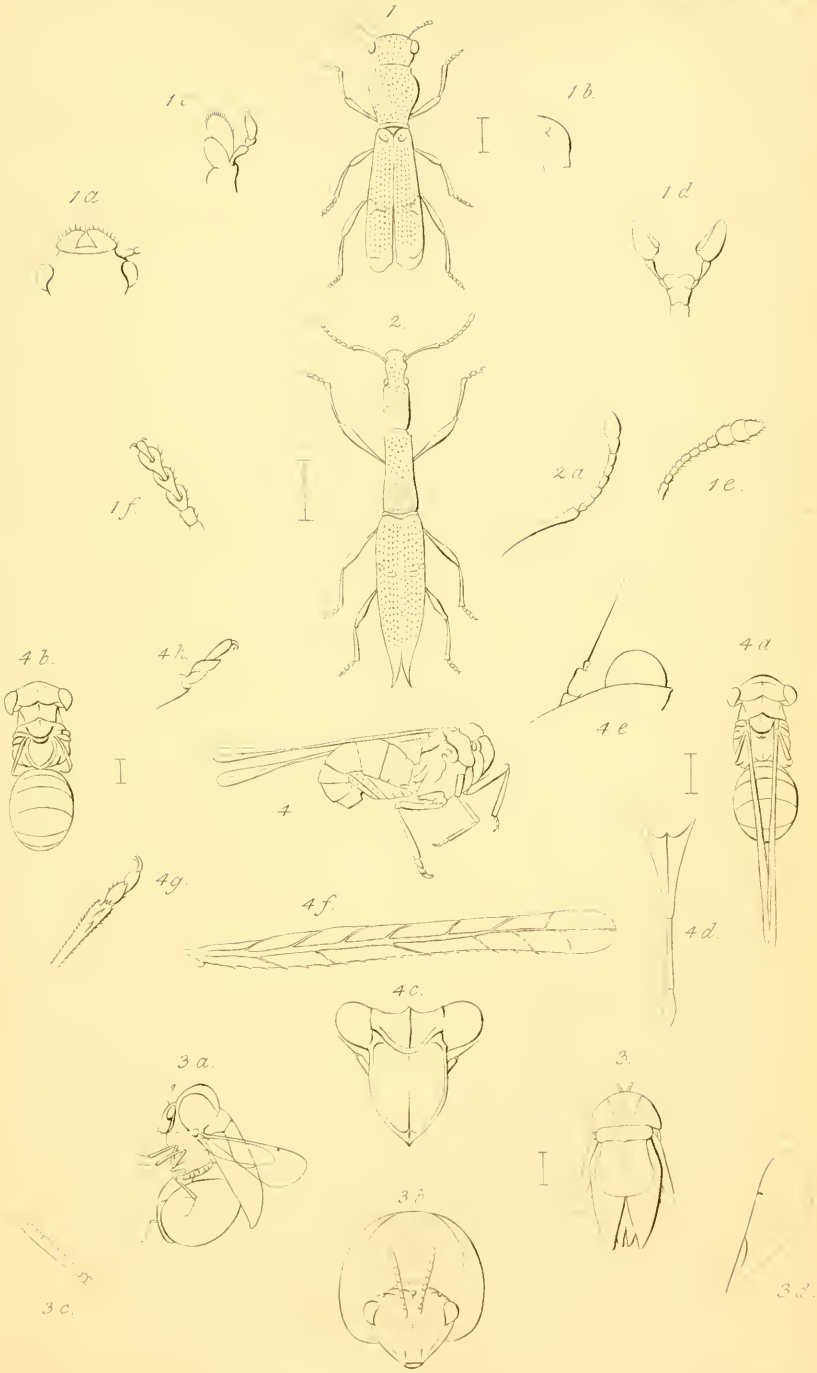
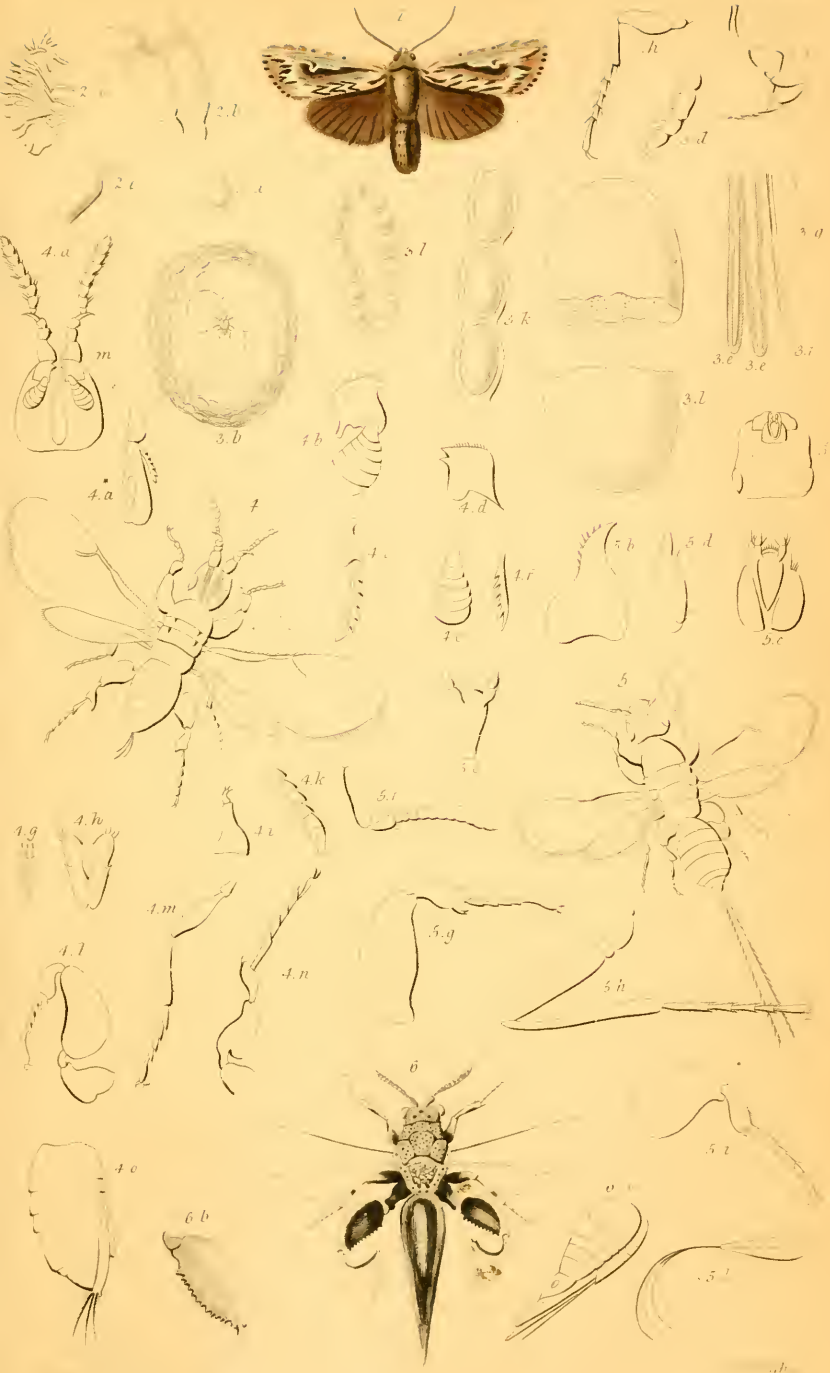

1
2
3
4
6.
7
6
4 d.
10 b.
10.
10 a.
11.
11 b
11 a.
10 d.
10 c.
12.
14 c
12 a
14 b
13 d.
13 g
13 c.
13 f.
13 b.
b x
b xx
14 f.
14 a.
13 c.
13 a.
14
14 c
14 d
13.

Fig 1 – Attidae [illegible] West Australia p.193
[illegible]

" 2 – [illegible] Sydney, Australia p.192

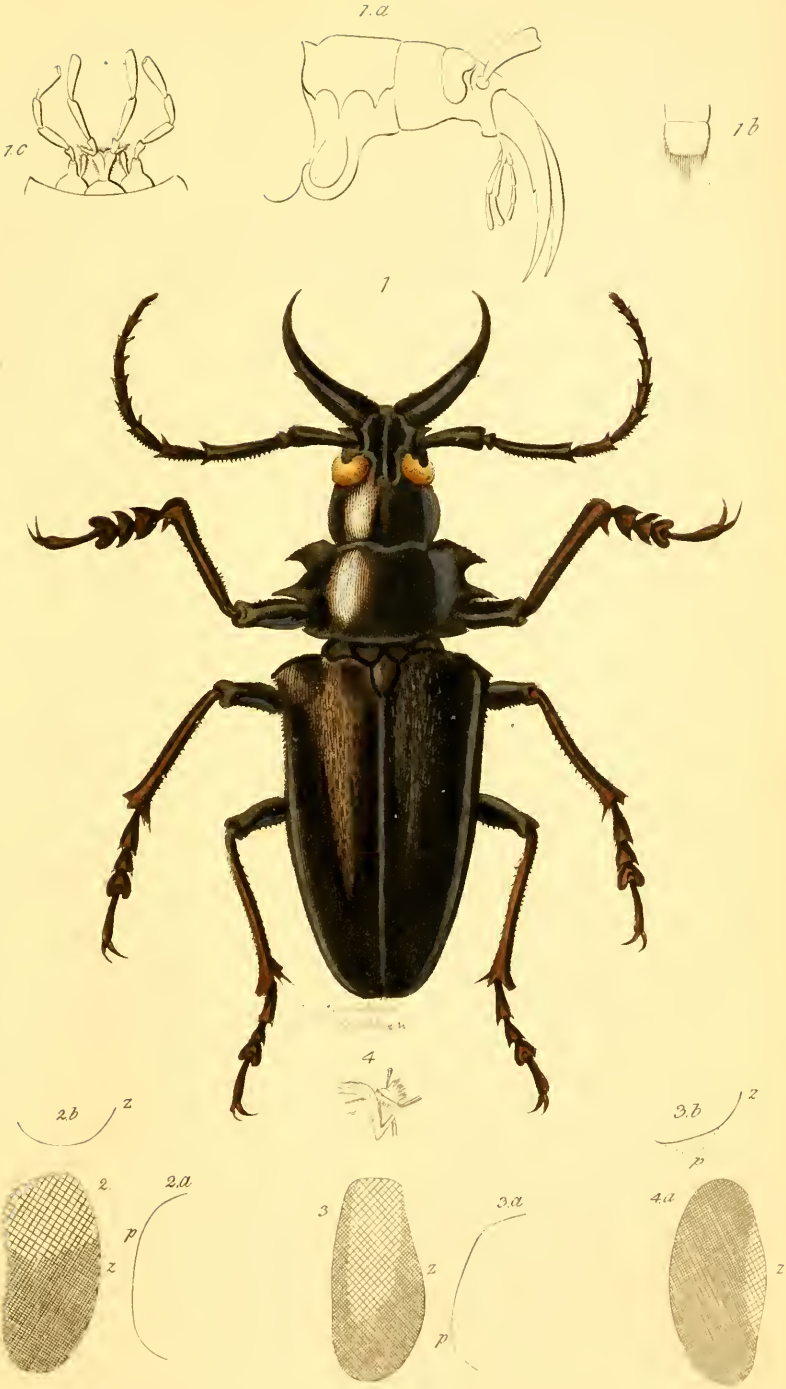


G. R. Waterhouse del.t

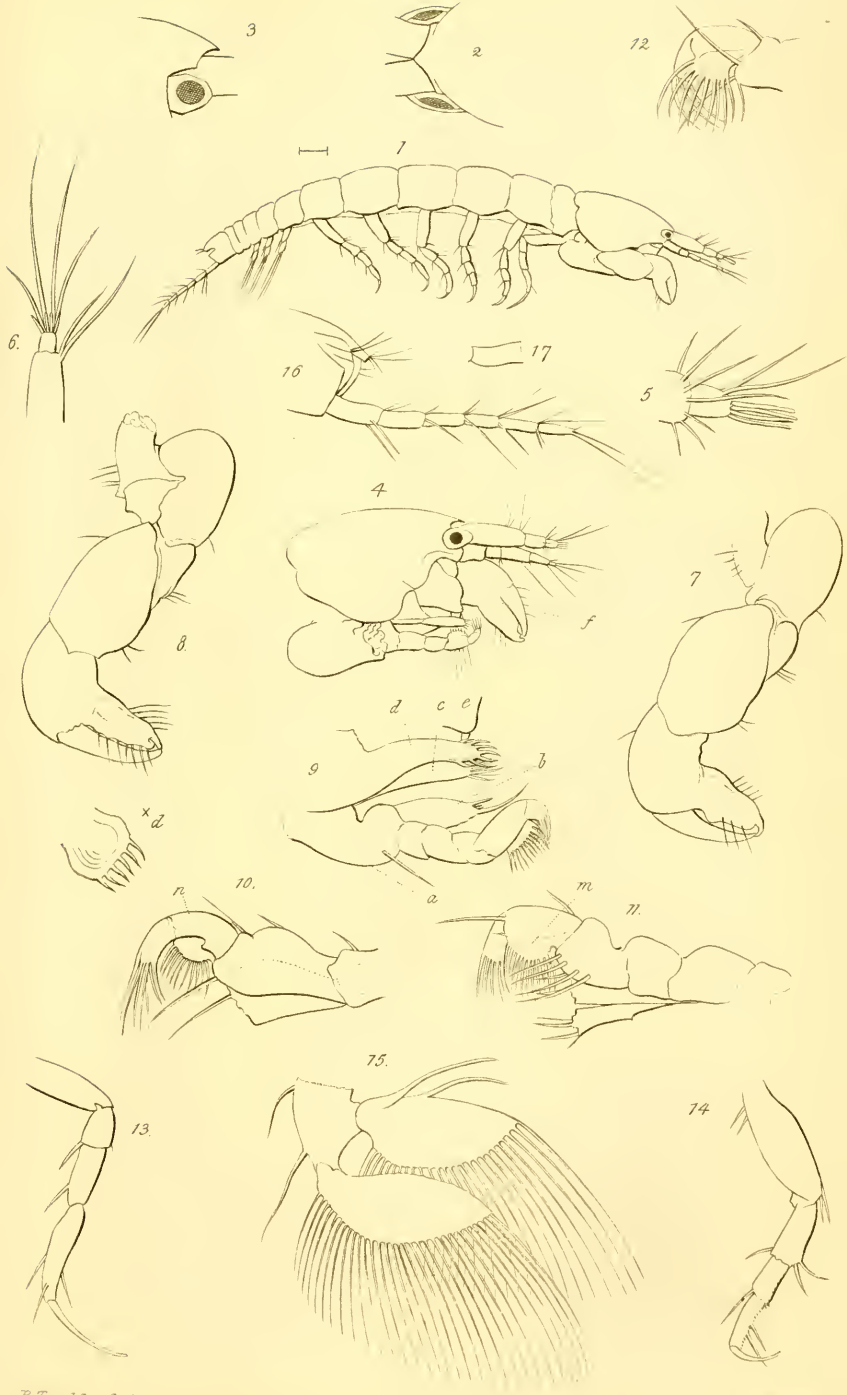


J. W. Whitwood del.

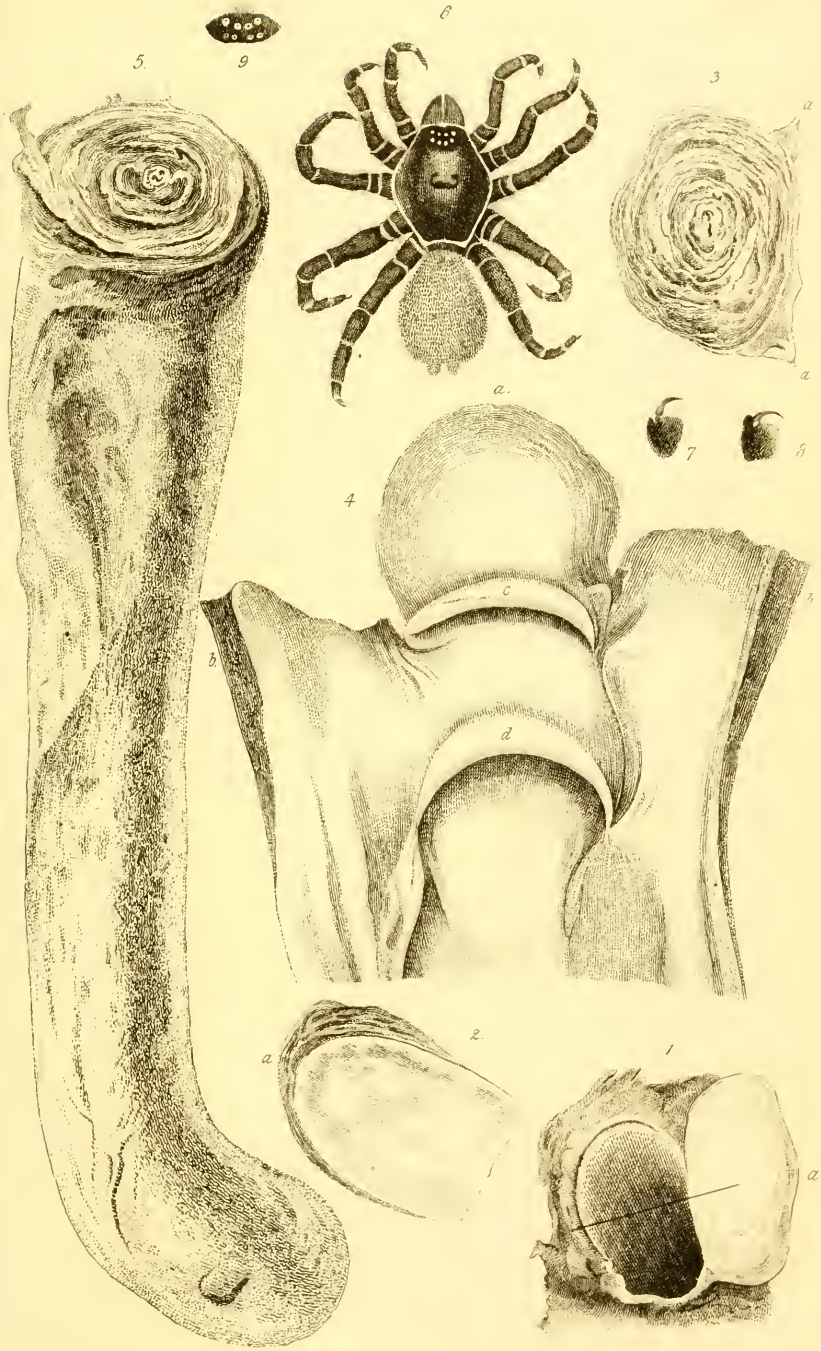
F[illegible] – Baladeva walker [illegible], p 226



J. O. Westwood del.

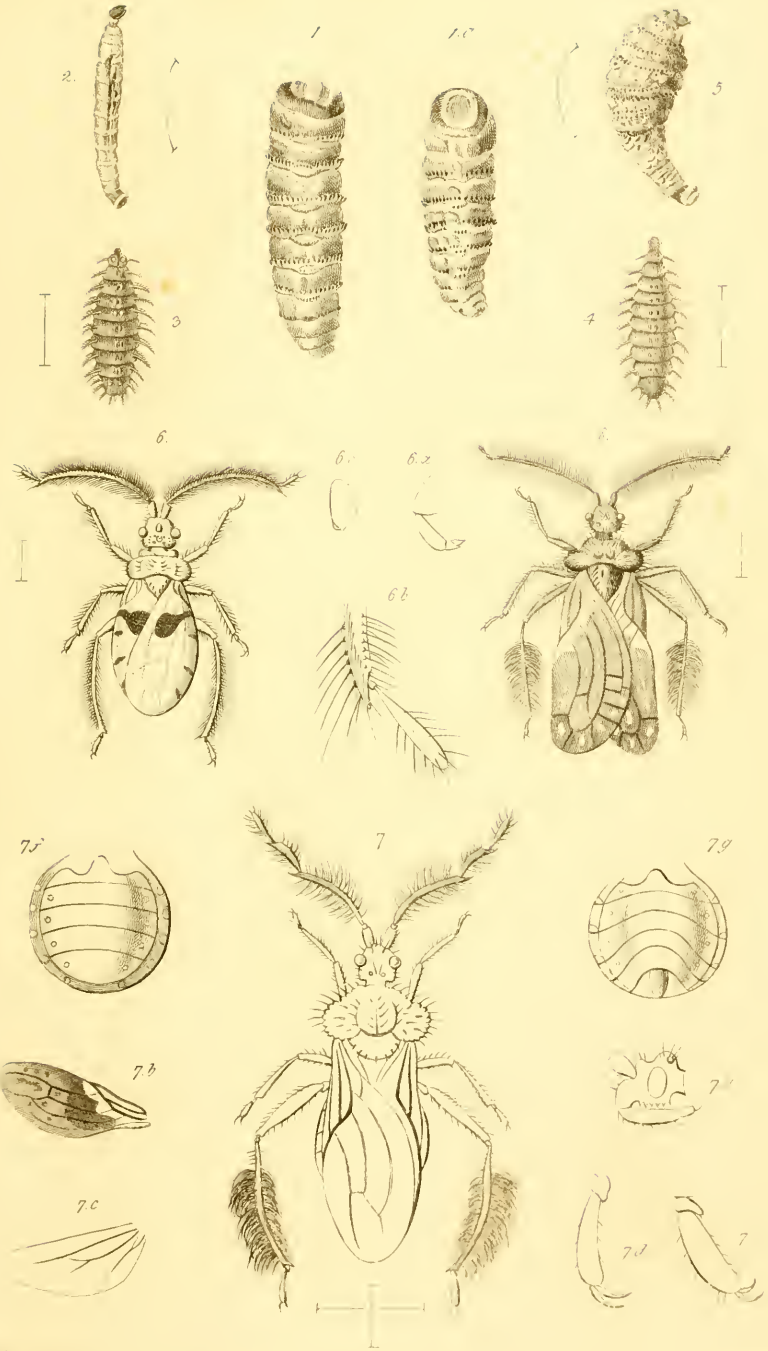


R. Templeton del.



W. Sells del.t

Swain


1
1.c
2.
3
4
5
6.
6.a
6.b
7
7.b
7.c
7.d
7.f
7.g

vol. 2. 1852-53

7.2858

SMITHSONIAN INSTITUTION LIBRARIES
3 9088 00843 2817